CHAPTER 11

Impacts on Social Fabric

CHAPTER 11: IMPACTS ON SOCIAL FABRIC

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1. The term "social fabric" embraces numerous complex and interrelated phenomena, including demographic and economic factors, behavioural issues (e.g. investment choices, political dynamics), social institutions (e.g. families), social organisations (e.g. municipalities and churches), and social networks, or relationships amongst people. The social fabric is underpinned by people's beliefs and sentiments, including a sense of *belonging* and identification with a particular social unit.

2. The concept of social fabric is profoundly influenced by different sociological perspectives. This scientific assessment builds on various theoretical overlapping approaches, focusing on local communities as relatively intact social systems, influenced by internal and external variables. South Africa, with its contested political and racial history, poses particular challenges for maintaining the social fabric, as local conflicts may develop along racial or ethnic lines.

3. The study area has significant social and economic variability, particularly from the arid and underpopulated western Karoo zone to the more fertile and populous eastern zone; these zones also have different ethnic, linguistic and social profiles. Consequently, almost all observations in this Chapter would, in practice, need to be refined and adjusted to local contexts.

4. The social fabric interacts with several key themes highlighted in this scientific assessment, notably the natural environment, which enables or hinders sustainability), economic development, tourism, agriculture, health, heritage and the "sense of place".

5. All resource development, including shale gas development (SGD), is particularly prone to creating local booms and busts, with rapid inflows and outflows of investment capital, labour, material and infrastructure. The phenomenon of boomtowns is a constant theme in international studies of mining, including SGD. The fate of boomtowns can vary significantly. Some boomtowns go through subsequent busts; and others level out after a boom. "Busts" can either be rapid and catastrophic declines (for example, when a mine shuts down), or a slow process of downscaling, or simply a transition from a construction phase to a less labour-intensive phase of energy production. The longer-term impacts vary across localities, as well as different kinds of resources being mined. One of the key variables affecting the economic and social future of resource towns is their ability to promote economic diversification.

Consequently, a long term strategic framework should be developed and promoted, during resource development as well as after downscaling and closure.

6. New extractive industries into an area can disrupt and alter the local social fabric in many ways. This can bring benefits in the form of new jobs and increased local revenue, but it can also bring a variety of social and public health harms. There is typically a period of adjustment and eventual stabilisation. Larger towns with diversified economies are more able to absorb rapid investments without social disruption.

7. Cumulative impacts can result from the aggregation (over time or space) and interaction of the impacts of a single activity. Cumulative impacts typically involve multiple actors and causal pathways. The impacts may affect stakeholders in different jurisdictions and involve issues that are legally regulated by multiple institutions; some issues do not fall under any formal regulatory authority at all. The analytical focus now becomes the *receiving entity* (a catchment system, a town, or a housing market), and not simply an impact *per se*. This will require a deeper understanding of the *properties of potentially impacted systems, over time*, even though the required information is often not available, and generalisations from other contexts are of limited use. The practice of 'Cumulative Effects Assessment and Management' (CEAM) within the field of impact assessment analyses complex adaptive systems. South Africa often faces particular challenges regarding the rigidity of government programmes and regulatory frameworks, so that inter-sectoral and cumulative impacts are seldom recognised or addressed.

8. All South African towns and rural areas are characterised by the legacy of racial segregation and *apartheid*, in their spatial form (racially-defined neighbourhoods) and social networks (poor levels of racial integration). This creates a constant backdrop to any other social dynamics and pathologies. It is very easy to exacerbate racial cleavages, and very difficult to overcome established patterns of racial differentiation. However, racial divisions are also intersected by factors such as gender, household income and educational status, so the issue should not be treated simplistically. Very few government programmes have successfully addressed the ongoing challenge of overcoming informal racial segregation patterns. However, some institutions such as schools have had an impact on overcoming racial schisms, among the youth as well as teachers.

9. This Chapter examines risks related to four main pathways: a) human migration; b) safety and security; c) social disruption; and d) governance. These are all interrelated in various ways, so they should not be considered in isolation.

10. For **human migration,** there will be pressure on housing and infrastructure, increases in the cost of living (and subsequent impacts on poverty levels), and the potential squeezing out of other alternative economic options. Almost all towns in the study area already experience housing backlogs, due to inter-town and farm-town migration trends. A key factor is the continued migration of work-seekers, which would start under Scenario 1 (Exploration Only). Once some work-seekers from elsewhere secure jobs and a foothold in the local town, it will encourage other people from their towns of origin to follow suit. Human in-migration to the affected environment often triggers inter-community conflict in competition for scarce resources, such as employment opportunities. The rise in incomes could lead to a property boom, with increased house prices. This, in turn, could increase municipal revenue from the rates base, in the medium term (houses are re-valued every five to ten years for rating purposes). If the exploration phase does *not* move on to the production phase, there will be a sudden and radical reduction in housing demand, and very likely an outflow of population. Mitigation efforts will include housing provision, training programmes and transparent employment practices. Municipal planning processes are typically slow and cumbersome, and therefore unable to respond timeously to these demographic fluxes.

11. As regards **physical security,** there may be impacts on levels of crime, fear of crime, traffic-related risks, pressures on policing agencies, and a sense of insecurity caused by seismic tremors and risks to clean household water supply. Crime could take various forms: By in-migrants, against in-migrants, xenophobia, and various social pathologies such as domestic violence. Increases in crime levels are not a foregone conclusion; they may decline due to increasing employment, but may spike again if SGD production declines or ceases. Various mitigation strategies are possible, depending significantly on the capacity of policing and social support agencies. Small towns in the study area will have to expand their traffic management capability significantly due to much greater traffic pressure caused by SGD trucking.

12. As regards **social institutions**, there may be more jobs and wages in the local community, stimulating new economic multipliers. However, this may be associated with increased competition for resources and xenophobia in a multi-racial society, disruption of local employment patterns, alienation, conflict and greater social inequality (which collectively

amount to a perspective called "the social disruption thesis"). The rapid influx of people tends to loosen social ties, with a constant population churn. New inflow of money, jobs and contracts will strengthen some families and weaken others, depending on people's spending patterns. New money may be channelled to education, food and housing, but also to alcohol, drugs, prostitution and lead to possible increases in teenage pregnancies and the human immunodeficiency virus (HIV). The social disruption thesis became accepted as 'conventional wisdom'. Over time, however, an increasing body of work has emerged that has challenged the findings reported in these early studies. Communities may become more resilient and adaptable over time; however it is not clear how much institutional effort will be required by other government agencies, to promote resilience. Furthermore, proactive company initiatives may well strengthen local social institutions. Various international agencies have compiled handbooks and guides to companies on promoting and supporting local social networks, institutions and capabilities.

13. In terms of **governance,** there may be increased pressures on already inadequate municipal governments to meet the growing demand for basic services, and new political tensions. Municipalities will be subjected to a wide range of demands for new or expanded services, and the administrative capacity, staffing levels, equipment, and outside expertise needed to meet those demands may be beyond anything that has been budgeted. In particular, road maintenance, traffic management and disaster management are likely to be heavy burdens. Municipalities are unlikely to benefit financially from SGD, because of their fiscal structure (dependence on property rates and service charges). Energy booms often bring concerns about bribery, corruption and fraud. Municipalities will require a great deal of institutional support and leadership development, to manage these challenges. The mineral leasing process typically involves experienced business people on one side and inexperienced farmers and municipalities on the other. This raises the risk that energy speculators will take advantage of local people, or that such perceptions are created, thereby detracting from municipalities' legitimacy. Companies' behaviour is determined by company policies as well as the decision-making style of local mine managers; in particular, their corporate social responsibility (CSR) policies and practices.

14. Various mechanisms are available to bolster local resilience and avoid excessive harm to the social fabric. These include a combination of South African mining approaches (Social and Labour Plans (SLP)), Social Impact Assessments (SIA), Social Impact Management Plans, United Nations Guidelines on Human Rights, and industry standards on community engagement. In addition, various forms of collaborative governance at local level, where local

interest groups can develop shared policies and programmes, will improve social networks as well as government capacity.

15. Municipalities, Provincial Governments and local communities should create local task teams to undertake monitoring of shale gas activities in their areas. This will require significant support by academics and researchers.

16. The risk assessment in this Chapter provides an overview of the possible consequences, the likelihood of them taking place, and the risk to the social fabric which they pose. These include:
    - *Slight but noticeable consequences* refer to small and manageable impacts, or impacts on small sections of the community, or those which can be generally addressed by existing institutions, or can easily be balanced or outweighed by positive impacts. The risks to the social fabric will be minor.
    - *Moderate consequences* refer to impacts which affect the bulk of the local population negatively, require some new institutional capacity, may well produce a net negative impact on the community, and would require some assistance by SGD companies and public authorities to manage. The risks to the social fabric will widespread, but manageable.
    - *Substantial consequences* refer to impacts which place significant strain on the bulk of the local population, require significant new institutional capacity to manage, and would require extensive assistance by SGD companies and governmental authorities to manage. This would require, inter alia, a new approach to regional planning and support. The risks to the social fabric would be extensive and burdensome.
    - *Severe consequences* refer to impacts which would cause significant social strain, would test institutional capacity to their limits, and would require significant SGD involvement to manage effectively. Regional planning and support systems would require extensive funding and skills to address possible impacts. The risks to the social fabric will be far-reaching and very negative.
    - *Extreme consequences* refer to impacts which could result in social or political violence or institutional collapse; mitigation would require a great deal of pre-emptive and far-reaching capacity-building as well as ongoing local partnerships between SGD companies, national government, municipal government, and local leaders. The risks to the social fabric would be profound, long-term and very destructive.

The analysis finds high levels of risk in all four causal pathways (migration, physical security, social relations and governance); however, mitigation measures can significant reduce the level of risk. The critical question will be the political will, on the part of Government and SGD companies, to abide by international guidelines on community engagement.

CHAPTER 11: IMPACTS ON THE SOCIAL FABRIC

11.1 Introduction: What is meant by "the social fabric"?

Social fabric: The term "social fabric" embraces numerous complex and interrelated phenomena, including:

- Demographic and economic factors;
- Behavioural issues (e.g. investment choices, political dynamics);
- Social institutions, such as families;
- Social organisations, such as municipalities and churches; and
- Social networks or relationships amongst people.

The social fabric is underpinned by people's beliefs and sentiments, including:

- A sense of *belonging* and identification with a particular social unit;
- A sense of *social justice* and equity, particularly in government policies;
- A willingness to participate in *shared activities*, and possibly undertake voluntary work;
- Attitudes of *acceptance* towards minorities and newcomers;
- A sense of *life satisfaction*, happiness, and positive future expectations; and
- A sense of *safety and security* (Markus, 2015:12).

The concept of social fabric is profoundly influenced by different sociological perspectives. This scientific assessment builds on various theoretical overlapping approaches, focusing on local communities as relatively intact social systems, influenced by internal and external variables. The work of Manfred Max-Neef (1992:198) broadly informs our approach, as he highlights the role of civil society and the social fabric to "to nurture local spaces, facilitate micro-organisations and support die multiplicity of cultural matrixes comprising civil society".

South Africa, with its contested political and racial history, poses particular challenges for maintaining the social fabric, as local conflicts may develop along racial or ethnic lines.

The study area has significant social and economic variability, particularly from the arid and underpopulated western Karoo zone to the more fertile and populous eastern zone; these zones also have different ethnic, linguistic and social profiles. Consequently, almost all observations in this Chapter would, in practice, need to be refined and adjusted to local contexts.

11.1.1 Interfaces with other scientific assessment chapters

The social fabric is closely interrelated with other Chapters in this scientific assessment, and it is by nature very multi-dimensional. The World Wildlife Fund for Nature (WWF) has identified five fundamental dimensions of well-being: Economics, subsistence, environmental services, cultural and spiritual dimensions, and the political system. The social fabric can be regarded as the totality of these dimensions (Dudley et al., 2008). The phenomenon of the social fabric therefore shares important interfaces with other Chapters:

- Through social networks and social institutions, there are interactions with the *natural environment*, including the use of land, water and vegetation (Jones et al., 2016) (see Hobbs et al., 2016 and Holness et al., 2016). The values, customs and practices of social groups affect the sustainability of natural resource use, which in turn affects the viability of social systems. There is an increasing understanding of the valuable role which the natural environment plays in human well-being.
- The social fabric also underpins the *economic system* (Hayden, 2011) (see Van Zyl et al., 2016). Social values, practices and institutions help to structure systems of production, distribution and consumption. Institutions such as municipalities and businesses play a key role in every link in these economic value chains. This affects manufacturing, tourism (see Toerien et al., 2016), transport (see Van Huyssteen et al., 2016) and agriculture (see Oettle et al., 216).
- The social fabric underpins specialist themes such as *heritage, health and "sense of place".* Heritage is often a product of the social fabric, as people, families, and cultures create material and non-material products which last for generations (see Orton et al., 2016); heritage in turn affects people's sense of place (see Seeliger et al., 2016), and may strengthen the social fabric when people organise to protect these cultural products. In particular, collective memory is important for the creation of a social fabric.
- The *health sector* is also directly linked to the "social fabric": Where social cohesion is poor, this may be reflected in poor health conditions, such as teenage pregnancies, alcohol abuse, high infant mortality rates, and typical poverty-linked diseases affected by poor nutrition and housing (see Genthe et al., 2016).

TERMINOLOGY

The community: Identifying "the community" in any specific context is not a straightforward matter. Communities can be identified on the basis of any number of shared traits such as geographic territory, religion, culture, history, and kinship. Furthermore, people can have multiple overlapping identities and these identities can change over time. Definitions of community are necessarily open to contestation, both in terms of the limits ("who is included"?) and the structure ("how do members interact with one another?"). In this report, the term *community* is used to refer to people's connection with their home town or district; however, this spatial identity may be affected by racial or ethnic identities. Communities may contain schisms, fault-lines and conflicts.

Social resilience: The ability of communities to respond constructively to disturbances; to maintain themselves, or to recover, adjust, and embark on new development options. Disturbances can be "pulse" events (occurring as discrete events) or "press" events (those that persist for extended periods of time). The term "resilience" is somewhat subjective, as some people may regard a community as resilient, whereas others may feel that it has lost its essential character or functions.

Institutions: The sets of social rules, behaviours, and relationships that last over time. Institutions may be formalised by organisational mandates (such as churches or municipalities), or they may be informal (such as families and kinship groups). Institutions are particularly important in promoting local resilience by reshaping policies and practices in changing circumstances (Wasylycia-Leis et al., 2014).

Boomtowns: All resource development, including shale gas development (SGD), is particularly prone to creating local booms and busts, with rapid inflows and outflows of investment capital, labour, material and infrastructure (Christopherson and Rightor, 2011).

The "social disruption thesis": New extractive industries into an area can disrupt and alter the local social fabric in many ways. This can bring benefits in the form of new jobs and increased local revenue, but it can also bring a variety of social and public health harms (MEDACT, 2015). There is typically a period of adjustment and eventual stabilisation (Chapman, 2015). Larger towns with diversified economies are more able to absorb rapid investments without social disruption (Brasier et al., 2011).

Monitoring and evaluation: Baseline studies should be conducted *before* any mining operations, so that the impacts can be tracked and measured. Some agreement needs to be reached amongst several disciplines on the kinds of indicators, the measurement of those indicators, and appropriate methodologies. In terms of local Integrated Development Planning processes, key local indicators should be identified and tracked according to national policies as well as local developmental priorities. Communities can participate in drafting indicators and conducting monitoring. This would count as best practice regarding planning and measurement.

Cumulative effects: Cumulative impacts can result from the aggregation (over time or space) and interaction of the impacts of a single activity. Cumulative impacts typically involve multiple actors and causal pathways (Franks et al., 2013; Duinker et al., 2013). The impacts may affect stakeholders in different jurisdictions and involve issues that are legally regulated by multiple institutions; some issues do not fall under any formal regulatory authority at all. The analytical focus now becomes the *receiving entity* (a catchment system, a town, or a housing market), and not simply an impact *per se.* This will require a deeper understanding of the *properties of potentially impacted systems, over time*, even though the required information is often not available, and generalisations from other contexts are of limited use. The practice of 'Cumulative Effects Assessment and Management' (CEAM) within the field of impact assessment (Loxton et al., 2013) analyses complex adaptive systems (Duinker et al., 2013).

11.1.2 Key assumptions regarding the social fabric in the study area

Shale gas development (SGD), like other resource mining activities, typically takes place in rural areas, of varying degrees of remoteness. The local settlement forms are usually commercial agriculture, small towns and other rural developments (such as natural parks, game farms, tourist sites, and heritage sites). This narrows the social fabric question to the impact of SGD on *small towns and rural hinterlands.*

The introduction of short-lived, spatially intense extractive industries in and around small, rural communities can profoundly change the social and economic fabric (Hays et al., 2013:39). Such changes can be positive as well as negative, and can affect different groups in the local community in very different ways (Esteves and Vanclay, 2009). Beneficial local effects could include local wage increases, increased purchases of local goods, corporate social responsibility projects, and local economic multipliers.

Rapid, large and novel SGD operations may be welcomed by some segments in the community, because they bring new economic life to underdeveloped rural localities. However, this may also bring developmental challenges and disrupt the social fabric in many ways, including the rapid in-migration of workers (Christopherson and Rightor, 2011; Tonts et al., 2012). Since the 1970s, there has been a growing international literature on the phenomenon of *"boomtowns",* and more recently, many sociologists have articulated a "social disruption thesis", which emphasises the negative social consequences of boomtowns. The specific components of the "boomtown" concept have been widely debated, so the term should not be applied in a simplistic fashion in South Africa.

Social impacts are often the product of numerous different interventions simultaneously, such as new inflows of money, new technologies, and new people. In turn, social impacts stimulate other causal relationships, creating *cumulative* impacts, involving several time frames, social scales, analytical disciplines and "reverse impacts" (Franks et al., 2008:2-3).

South African towns are in many ways similar to United States (US) and Australian towns, where there is a large literature on boomtowns, resource towns and SGD towns. Jacquet and Kay (2014) suggest four typical assumptions of the "classical" boomtown literature. South Africa meets at least two of these assumptions: a) fairly remote rural towns; and b) non-local ownership of mining operations. But South African towns have their own characteristics, drawn from more African trends (such as indigenous culture and migration patterns). There are, as yet, no African SGD towns. Comparisons between South Africa international case studies should be treated with some caution.

There is a growing appreciation for context-specific development factors, guarding against blanket generalisations about the impact of mining on the local community (Tonts et al., 2012; Deller and Schreiber, 2012). Some communities may experience more positive impacts, while other may be affected more negatively; also, within a single community, different people may have very different experiences (Forsyth et al., 2007). Key determining factors include existing socio-economic and demographic structures of towns, the political economy of the resource itself, the role and behaviour of companies, and regulatory and institutional structures (Chapman et al., 2015). Other key characteristics include climate, terrain, natural amenities, distance from metropolitan areas, local skills, poverty rates, age profiles, educational attainment, population density, culture and lifestyle (Hays et al., 2013; Deller and Schreiber, 2012). Social dynamics are profoundly influenced by human agency (whether that of leaders, followers or institutions). Different towns in the study region have very different trajectories, based on local leadership and institutions, and this will influence the potential impacts of SGD.

The fate of boomtowns can vary significantly. Some boomtowns go through subsequent busts; and others level out after a boom. *"Busts"* can either be rapid and catastrophic declines (for example, when a mine shuts down), or a slow process of down-scaling, or simply a transition from a construction phase to a less labour-intensive phase of energy production (Jacquet, 2009:24). The longer-term impacts vary across localities, as well as different kinds of resources being mined. One of the key variables affecting the economic and social future of resource towns is their ability to promote economic diversification. In the US, gas-related boomtown phenomenon often takes the form of several sequential mini-booms and mini-busts, as work proceeds from one well to another (Jacquet and Kay, 2014).

Communities may be fairly adaptable to large-scale and rapid changes. Over time, communities are likely to experience significant shifts in their sense of contentment and social cohesion. This may initially take the form of declining social cohesion, but later they may evolve a greater sense of acceptance and a restoration of social networks (Brown et al., 2005).

A significant difference between the US shale gas experience and that which is likely to take place in South Africa, is the ownership of mineral rights: In the US, this vests in landowners themselves, whereas in South Africa, it vests in the state. In the US, shale gas companies have therefore expanded their deals with landowners, with two significant consequences: They have offered large bonuses to landowners, and they had to drill within a specified time period, to keep legal access to these land-holdings (Jacquet and Kay, 2014:4). This has contributed to large amounts of money flooding into

local communities, and creating local social divisions, economic multipliers and unstable local economies. In South Africa, this scenario is likely to be much more muted.

All South African towns and rural areas are characterised by the legacy of racial segregation and *apartheid*, in their spatial form (racially-defined neighbourhoods) and social networks (poor levels of racial integration). This creates a constant backdrop to any other social dynamics and pathologies. It is very easy to exacerbate racial cleavages, and very difficult to overcome established patterns of racial differentiation. However, racial divisions are also intersected by factors such as gender, household income and educational status, so the issue should not be treated simplistically. Very few government programmes have successfully addressed the ongoing challenge of overcoming informal racial segregation patterns. However, some institutions such as schools have had an impact on overcoming racial schisms, among the youth as well as teachers.

The social fabric also underpins the political system. South Africa is a constitutional democracy, based on universal franchise, democratic representation, devolution of powers, the protection of individual rights through a Bill of Rights, and public participation in development decision-making. Subject to the limitations imposed by Section 36(1) of the Constitution, individuals enjoy protection of their rights to, *inter alia*, to an environment that is not harmful to their health or wellbeing. These rights provide an important framework whereby local communities can address possible challenges to their health and welfare.

However, the practical functioning of the political system at local level is often conflictual and contested, often on racial and linguistic lines. There is inter-party competition (often overlaid by racial identities), as well as ongoing intra-party conflicts within the majority party (the African National Congress (ANC)). Local disputes are often affected by political party dynamics, creating a potentially volatile political environment.

The social fabric is affected by a wide range of sectoral policies, including health, education, social development, policing, economic development, and municipal governance. The potential array of legislation impacting the social fabric is vast. Most significantly, South Africa has a comprehensive public funded social protection programme. The *Social Assistance Act* (2004) creates a broad social protection strategy (Devereux, 2010; Coetzee, 2014; Committee of Inquiry, 2002). Several types of grants are available: Grants for Older people, Disability grants, War veterans' grants, Foster care grants, Child support grants and Grants in Aid. Poor people also have access to other developmental initiatives such as the National Schools Nutrition Programme, the Expanded Public Works Programme (EPWP), the Municipality Infrastructure Grant (MIG), municipal services subsidies, and

the Umsobomvu Youth Fund (UYF). These grants have generally positive effects on poor communities (although some abuses may exist) and on sustaining local economic multipliers in rural towns.

11.2 Scope of this Chapter

This Chapter examines risks related to four main causal pathways: a) human migration patterns; b) physical security (and psychological sense of security) in local communities; c) altered social relations and institutions; and d) impact on governance and power dynamics. In each of these pathways, subsidiary causal dynamics are identified, which may impact on the general direction of causality. These are:

1. For human migration, there will be pressure on housing and infrastructure, increases in the cost of living (and subsequent impacts on poverty levels), and the potential squeezing out of other alternative economic options (see Van Zyl., 2016 and Toerien et al., 2016). Human in-migration to the affected environment often triggers inter-community conflict in competition for scarce resources, such as employment opportunities. Mitigation efforts will include training programmes and transparent employment practices.
2. As regards physical security, we consider impacts on levels of crime, fear of crime, traffic-related risks, pressures on policing agencies, and a sense of insecurity caused by seismic tremors and risks to clean household water supply (see Hobbs et al., 2016). Various mitigation strategies are possible.
3. As regards social institutions, there may be increased competition for resources and xenophobia in a multi-racial society, disruption of local employment patterns, alienation, conflict and greater social inequality. New inflow of money, jobs and contracts will strengthen some families and weaken others, depending on people's spending patterns. New money may be channelled to education, food and housing, but also to alcohol, drugs, prostitution and lead to possible increases in teenage pregnancies and the human immunodeficiency virus (HIV). However, proactive company initiatives may well strengthen local social institutions.
4. In terms of governance, there may be increased pressures on already inadequate municipal governments to meet the growing demand for basic services, new political tensions, and a possible increase in corruption, rent-seeking and gatekeepers. SGD companies may, however, contribute to building municipal capacity in key functions.

There are various ways to analyse and classify possible causal pathways affecting the social fabric. Figure 11.1 below illustrates insights drawn from the international literature on SGD; it is possible that South Africa may, in fact, diverge substantially from these trends:

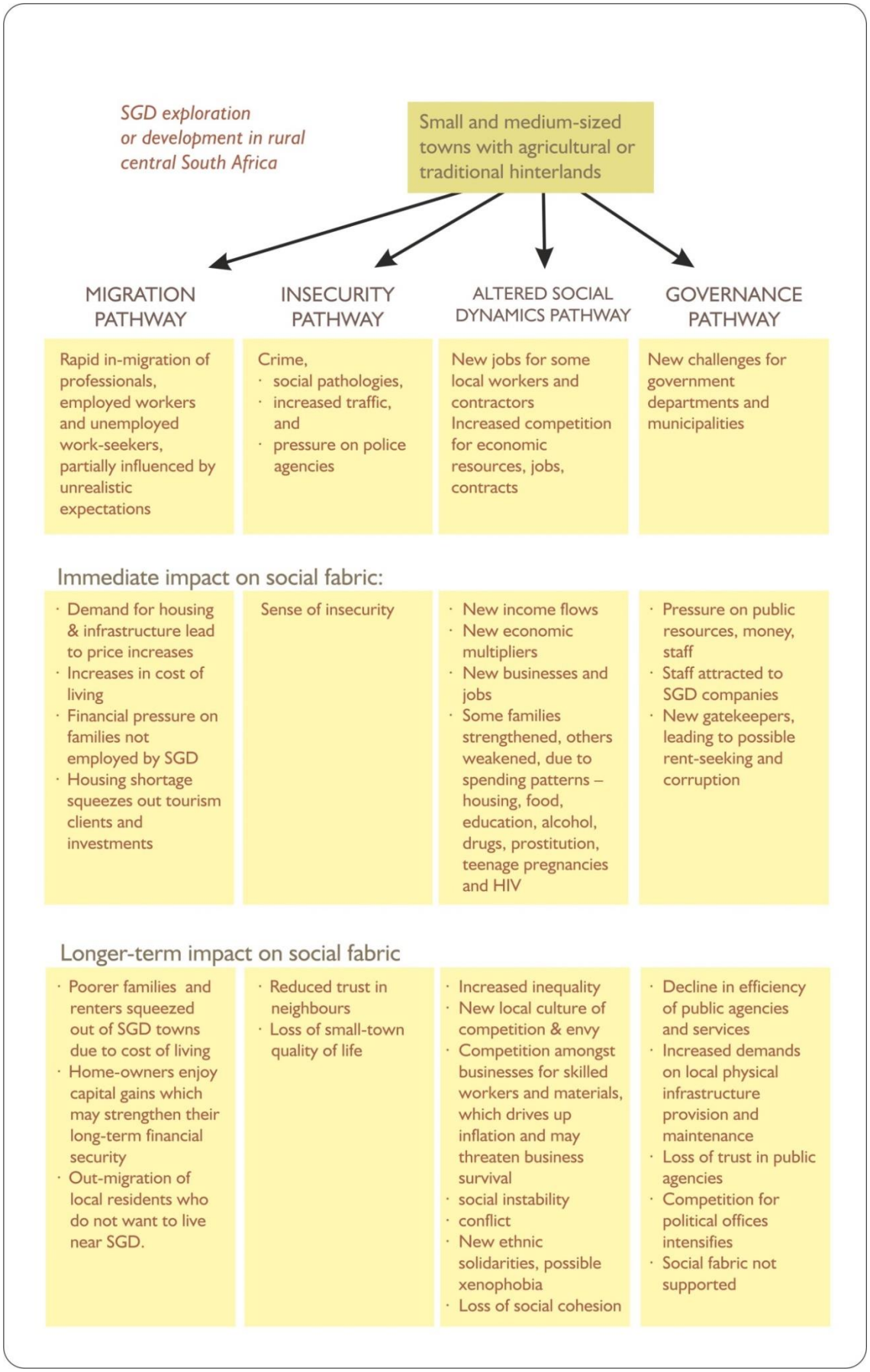

Figure 11.1: Potential causal pathways affecting four dimensions of the social fabric.

11.3 Impact 1: Rapid in-migration

11.3.1 Description

SGD requires more employees and materials than conventional oil and gas drilling (Brundage et al., 2011:20). These processes are much more industrial in nature, labour intensive, and technologically advanced than conventional shallow gas development. They often involve a wide range of subcontractors.

A general factor affecting resource development is the rapid increase in a transient population (Christopherson and Rightor, 2011). The increase in population may take place in the core localities, or in the larger towns nearby. The drilling workers may be specialist teams from elsewhere in the country. Even more basic jobs, such as construction, trucking or services may consist of itinerant teams moving along from one site to another – i.e. they may not be local workers. This usually means an influx of young men – some with families, many without. New work-seekers may arrive, in anticipation of securing jobs (MEDACT, 2015; Deller and Schreiber, 2012; Jacquet, 2009, Chapman et al., 2014). There is an added concern that people throughout the country may have unrealistic expectations about employment possibilities, and may migrate into the regions in large numbers.

This Chapter explores impacts on housing as well as social and psychological dynamics. Project-induced rapid migration has been experienced throughout the world, with a wide range of problematic consequences (IFC, 2009), particularly because it leads to local competition for resources amongst different groups, and places strains on public service delivery.

The immediate impact will be an increase in rental housing demand, depending on four factors:

1. The speed and scale of industry growth in a given community: A fast pace of development, with a high number of wells drilled in a single year, means the drilling activity within a community will be concluded more quickly than if the drilling activity occurs over a longer timeframe. Therefore more workers will be required per year, with more housing, infrastructure and road usage needs, which will be more difficult for local communities to manage. A slower pace of development will be less disruptive and will extend economic benefits over a longer period of time (Kelsey, 2011: 13);
2. The existing housing capacity of a community before drilling begins;
3. Companies' policies on providing their own staff housing; and
4. The availability of local skills relevant to SGD operations (Raimi, 2012).

Housing shortages and high living costs generate significant economic insecurity, especially among already vulnerable populations and those on low or fixed incomes, including the elderly (Ryser and Halseth, 2011; McKenzie, 2015; Williamson and Kolb, 2011), with some poorer people becoming subject to homelessness, overcrowding or being forced out of town (Ennis et al., 2014). As a result of rising housing costs, cheaper housing options such as caravan parks, tents and garages may be sought by long term residents (Chapman, 2014; McKenzie, 2015). The pressure on housing can be alleviated by companies providing temporary housing units (sometimes called "man camps").

Private investors and Government may be reluctant to initiate housing projects for the new workforce, because of the unpredictable cycle of SGD (Christopherson and Rightor, 2011). Slow Government progress regarding land release for worker housing can create development bottlenecks and delays (Haslam-McKenzie, 2013), due to complex and time-consuming approvals processes. Rapid housing price increases can launch a property construction boom with inflated house prices; however, these entrepreneurs may then face rapid declines in property values once SGD tapers off in that area. When production ceases or declines, it will cause retail to decline, shops may stand empty, and this may lead to foreclosures on people who cannot meet their mortgage payments (Shigley, 2009).

New SGD operations, and an influx of workers, can place great pressure on services and infrastructure maintenance and expansion (Chapman et al., 2014). Levels of service to the local population may therefore decline. Maintenance of new infrastructure is costly for municipalities (Christopherson and Rightor, 2011:365), particularly in the post-boom period, if population levels decline and local tax bases shrink. However, SGD companies may make a contribution to municipal infrastructure revenue, by means of grants or service payments. As local workers in SGD receive improved levels of income, they may well use this income to improve their housing status, thereby adding to the local housing stock.

Because of the rising demand for housing and other goods and services, the cost of living is likely to increase (Raimi, 2012; Chapman et al., 2014). Inflation tends to have a greater impact on the poor than on more wealthy community members.

Rates for hotel rooms and rental units increase in response to greater housing demand (Christopherson and Rightor, 2011; Chapman et al., 2015). Hotels may be booked out for years in advance (Raimi, 2012). This would limit tourism, casual visitors and other business people (Haslam-McKenzie, 2013; Raimi, 2012). However, it would mean an economic windfall to accommodation providers, and may increase levels of local employment.

11.3.2 Scenario 0: Reference Case

All towns in the study area have experienced population growth between 1996 and 2011, at an increasing growth rate (Atkinson, 2015; Nel and Hill, 2008; Groenewald, 2008). This is partially due to in-migration into the region, as well as migration of farm workers into to the towns. Some towns have a strong inflow of seasonal farm workers (Sundays River Local Municipality (LM), 2013; Breede Valley LM2014).

Almost all towns in the study area are already experiencing housing backlogs, with local people waiting for government-built houses. The backlogs are stimulated by migration, as well as "unbundling" of households; replacement of traditional huts by brick houses; and replacing poorly-constructed houses. Therefore, there is generally a pressure on housing provision, as well as providing water, sanitation and electricity infrastructure to residential sites (see Table 1 in Digital Addendum 11A). In many municipalities, land is not available for housing; or if it is available, it will need a long process of land acquisition, subdivision, servicing and title deed registration. Traditional areas are particularly challenged by the informal land tenure system, giving rise to sprawling informal settlements. There is also a growing demand for affordable middle-class housing, mainly due to the growing class of black officials (such as teachers, police, and municipal officials).

Several municipal Integrated Development Plans (IDPs) mention a lack of adequate local construction skills (see Table 2 in Digital Addendum 11A), although there are two construction companies in Cradock. Several IDPs also mention the lack of housing administration capacity within the municipalities, due to inadequate staff or technical training (see Table 3 in Digital Addendum 11A).

Without SGD, it is likely that inflows into rural towns will continue, and the demand for housing for the poor and the middle class will continue to grow. This will require additional land acquisition, service provision, land registration and other tasks associated with housing expansion. The major form of risk is that in-migration outpaces SGD job creation, and/or that in-migration destabilises local communities.

11.3.3 Scenario 1: Exploration Only

Much of the international literature deals with workers from elsewhere; who move to resource towns on a temporary basis. It is not clear whether these workers are seeking jobs, or whether they already have secured jobs when they arrive. The general impression is the latter: These are workers who have some mining experience and some previous work in the gas company, and now arrive to work on a new rig in a new town. Possible employment for the Exploration Only scenario is as follows (Table 11.1):

Table 11.1: Potential employment for the Exploration Only scenario.

Scenario	Specialist staff per year	Local staff per year	Number of years
Exploration Only	800	450	8

A very important question is the likelihood of local employment, compared to in-migration of workers. A study in the Marcellus Shale region showed that most of SGD occupations require no formal post-secondary education; however, nearly all of them require skills and knowledge unique to the SGD industry, which need to be learned through on-the-job experience (Brundage, 2011: 36). Another factor is the hard work ethic, working long hours in difficult conditions, which is required from the workers. Once again, this is typically appropriate for people who have significant previous experience of the industry. These factors will inhibit local people from obtaining and keeping jobs during the Exploration Only scenario, as well as during Scenario 2 (Small Gas) and Scenario 3 (Big Gas).

"General labour" accounted for about 20% of the SGD workforce in Pennsylvania. In addition to SGD staff, there would be indirect employment creation by construction firms (building roads, housing camps and pipelines), as well as businesses providing food and other social services. At the start of SGD, these posts would be suitable for local workers.

In South Africa, there are likely to be five employment scenarios, with different housing requirements:

1. Recruitment of expatriate and South African professionals, who would stay in local hotels or guest houses. During Exploration, the 800 specialist staff (all in-migrants) per annum, for a period of eight years, may not be in the town all the time; they may come and go as their services are needed. Nevertheless, for small Karoo towns to absorb such staff, often staying for weeks or even months, would pose massive challenges for local housing provision. Most Karoo towns have about four to ten guest house or hotel establishments, possibly with an average of 20-50 rooms per town. They are likely to be booked out by the shale gas companies (as has been done by road construction companies and renewable energy companies in the Karoo). This leaves very few rooms, if at all, for tourists or business travellers. These professional employees may be scattered over several towns, which would lessen the impact. The risk is that recreational tourists may be replaced by business tourists, and that this would make businesses more vulnerable in the long term, when SGD declines in the area.

2. Some longer-term national specialists may bring their families and would require rented homes. This may offer a windfall to homeowners. It is likely that existing rental stock will be rented out at premium prices; this in turn may force out families who were already renting houses and apartments. The main risk is that the existing housing shortfall will be exacerbated, with deleterious social consequences for families without adequate accommodation.

3. Locally recruited general workers will either continue to live at home and be transported to work on a daily basis, or will live in the on-site "man-camps".

4. Unskilled or general workers from further afield would migrate to the local Karoo towns in search of work; if successful, they will either live at the on-site "man-camps" or in back-yard shanties or informal settlements.

5. Unskilled or general workers from further afield, who migrate to the Karoo, but are not successful in securing work, may find temporary backyard accommodation in the local town, waiting for job opportunities to open up, or resorting to the informal sector (such as trading or food sales). The risk is that this may give rise to new or enlarged squatter camps, or backyard shacks, placing more strain on water, electricity and sewerage services.

The factors described in the Reference Case (existing housing constraints, described above) suggest that that a sudden rapid additional inflow of workers or work-seekers will strain the local housing stock, housing waiting lists and municipalities' ability to acquire suitable serviced land for housing expansion. Renting out shacks will also be a financial windfall for existing house owners or renters, but with several cumulative consequences: It will drive up rentals which may force out existing very poor people who have been barely subsisting in very basic conditions. These people may have to move in with families into overcrowded homes, or may build new shacks on the edge of town (where there may not be services such as water, sewerage or electricity).

The influx of people will certainly put pressure on local water resources (in the arid Karoo), as well as the capacity of sanitation systems. The risk is that it could lead to ongoing service provision and management problems, such as sanitation blockages and spills.

The pressure on rentals as well as other consumer goods will increase the local cost of living, thereby increasing the strain on the local residents who are not benefiting directly or indirectly from SGD (i.e.

employees and housing providers). This creates the risk that local economic inequalities may be exacerbated, as the fortunes of people benefiting from SGD jobs diverge from those who do not. However, with indirect jobs created, there may be more money in circulation, to afford higher rentals. The greater the stimulation of additional economic multipliers in other sectors; the greater the mitigation of the risk of inequality.

Given that the future of SGD would still be fairly uncertain, it is unlikely that Government would invest capital for expanding housing and infrastructure stock. This situation creates the risk that the pressure on existing stock and resources would therefore continue for at least eight to ten years.

The rise in incomes could lead to a property boom, with increased house prices. This, in turn, could increase municipal revenue from the rates base, in the medium term (houses are re-valued every five to ten years for rating purposes). If the Exploration Only scenario does *not* move on to the Small or Big Gas scenario, there is the risk of a sudden and radical reduction in housing demand, and very likely an outflow of population. Many accommodation providers will have a "livelihood shock" in terms of sudden decline of revenue. This will set in motion numerous negative multiplier patterns, affecting particularly the retail and construction industries. It may even lead to a decline in municipal rates, thereby putting pressure on the municipality. These impacts may be mitigated by deliberate attempts to diversify the local economy, during the exploration phase; this would help to stabilise economic fluctuations.

11.3.4 Scenario 2: Small Gas

This scenario builds on the previous one; it assumes that sufficient gas reserves, at appropriate prices, can be extracted to undertake production for local or regional use in the Karoo. Consequently, it follows about eight years of steady in-migration into the local Karoo towns, as illustrated in the Exploration Only scenario.

During this phase, employment declines significantly from exploration levels (Table 11.2):

Table 11.2: Potential employment for the Small Gas scenario.

Scenario	Specialist staff per year	Local staff per year	Number of years
Small Gas	120 (down from 800)	180 (down from 450)	25

Following a decision to undertake limited production, Government may start allocating capital funding (assuming that it has the resources to do so), which can provide new serviced residential sites and housing stock. This will relieve a great deal of the pressure on housing and services. However, it

will also mean that guest house establishments and people who rent out accommodation will gradually experience a decline of income (from this sector), and would have to turn back to conventional tourism markets (if possible).

If SGD were to proceed in the region, then some of the Karoo towns may become single industry resource towns (SIRTs), which magnify their exposure and risk to global economic shifts (Argent, 2013), typically dominated by a single firm. The economic future of the towns will depend on whether there is economic diversification or not. SGD impacts on tourism are particularly important. If the towns can re-energise their tourism industry, there will be sufficient accommodation capacity. However, if the town, region or hinterland has been environmentally damaged due to SGD, either in terms of water quality, architecture, landscapes, or reputation, then a shift towards tourism may be difficult. Where the natural or cultural attractions of the local area have been compromised, it will probably reduce or completely eliminate the flow of investment in tourism.

In SGD towns, increasing economic multipliers may lead to a changing profile of local businesses, from family-owned to chain stores. There is the risk that small, locally-owned businesses may be forced out. If SGD activity were to decline at a later stage, chain stores may close or scale down, and local economic resilience may decline.

If other productive sectors, such as tourism or agro-processing, are not able to stimulate housing demand, then towns may start a long-term trend of decline. As jobs and incomes decline, there may be a degree of out-migration, particularly of work-seekers, as well as people who prefer a more rural quality of life. This creates the risk of undermining local social capital and support networks.

When this phase starts, some of the original migrant workers may have become permanently attached to the SGD company and its local operations, and they may have brought their families (either working class or middle class) to settle in the town. This may help to sustain property values.

A key factor is the continued migration of work-seekers, which would start under the Exploration Only scenario. Once some work-seekers from elsewhere secure jobs and a foothold in the local town; it will encourage other people from their towns of origin to follow suit. A “migration path” may be created, whereby work-seekers steadily migrate to Karoo towns; if they do not secure SGD work, they may find informal housing and try to find other jobs or even odd-jobs. Such workers, tied by cultural, location and even kinship links, may use their own “social capital” to access housing and jobs, possibly squeezing out local people. If the Small Gas scenario brings a down-turn as exploration moves to SGD, these people may choose to remain in the area, particularly if their families have

accompanied them. This creates a risk of ongoing social tensions between in-migrants and local people

It is not clear whether migrant SGD workers would bring their families with them. If they do, their children would then need to be accommodated in local schools. Many schools in the area (particularly no-fee schools) are already filled to capacity.

11.3.5 Scenario 3: Big Gas

If the limited phase development proves to be profitable, and a phase of large-scale production ensues, then employment will increase again (Table 11.3):

Table 11.3: Potential employment for the Big Gas scenario.

Scenario	Specialist staff per year	Local staff per year	Number of years
Big Gas	800 (increase from 120)	1200 (increase from 180)	30

This may well give rise to new rounds of in-migration, either of people already working for SGD companies, or of new work-seekers. Pressure on housing, infrastructure provision and schools is likely to increase. The main pressure on housing is likely to take place during the drilling phase of each well, calculated at about 98% of jobs in the Marcellus shale region (Brundage et al., 2011:5). This is usually regarded as the "boom" period. During the production phase, only very few workers remain, and they are likely to be situated at company offices further away. However, future scenarios are not at all clear; in the Marcellus region, scenarios varied from: a) a relatively quick flurry of activity that subsides when drilling moves to another location; b) high intensity drilling that jumps from hotspot to hotspot; and c) moderate and sustained drilling across an entire basin (Brundage et al., 2011:21).

A significant factor is that SGD is highly responsive to international energy prices. Experience in the US has shown that price volatility may lead to companies putting their local operations on hold, if prices are low, and then re-start operations after price recovery (Jacquet and Kay, 2014). This creates the risk of a series of mini-booms and mini-busts in local economies, with staff moving in and out of the locality, in sequential waves, and destabilising local social networks and planning processes. During the later stage of development, when the industry has matured, a greater number of local people are likely to be employed, as they would have developed the required skills and experience (Brundage et al., 2011:20).

11.3.6 Options for mitigation of risks

In-migrants bring revenue, at least to certain service providers (e.g. accommodation). This revenue flow can create local jobs and multipliers, stimulating new rounds of wealth-creation – at least for some people. The most effective mitigation of "boom and bust" cycles is economic diversification. However, this will require pro-active steps by municipalities and SGD companies.

The organisation called *Equitable Origin* has devised standards for the shale gas industry. They recommend that companies pre-emptively assess potential negative economic impacts on local communities of a large and sudden influx of labour. Companies should devise mitigation measures in collaboration with authorised representatives of the affected community and local governments. They can also take measures such as the design of temporary worker camps, community programs and cultural safeguards to reduce potential negative impacts and augment positive impacts (Equitable Origin Standards LLC, 2015:17).

In the discussion below, we differentiate mitigation efforts that have implications for: i) policy; ii) spatial development frameworks; and iii) project specific Environmental Impact Assessments (EIAs). We also differentiate between the primary agencies responsible for mitigation: i) national government; ii) provincial government; iii) LMs; and iv) private developers.

Measures for mitigation could include:

1. *Companies:*
    - Promote local employment: Companies need to create transparent methods for job applications and criteria for hiring staff, possibly indicating that preference will be given to local applicants, if sufficiently skilled. SGD companies themselves may offer training courses to assist local people, or family members of in-migrants, to improve their schooling and/or technical training. Oil and Gas Industry Associations have provided guidance for reporting on local recruitment and training (IPIECA et al., 2015). These measures will be the responsibility of SGD companies; however, it will require policy guidelines set by national government departments, notably the Department of Mineral Resources (DMR).
    - Create sufficient man-camps to house migrant workers, and out-source catering and services to local residents, thereby stimulating local wealth creation without adding pressure to municipal services. This will be the responsibility of SGD companies, acting within local and district municipal development frameworks (such as IDPs).
    - Sign long-term leases and contracts with local guest houses, so that they can be assured of a steady flow of income over several years, and possibly use this income to add to their accommodation facilities in order to maintain the tourism market. This will be the

responsibility of SGD companies, as a private arrangement between them and tourism providers.

2. *Public authorities:*
    - Pro-actively release land for housing, and install infrastructure, so that in-migrants can build informal housing if required (in the short-term), or provide public housing (in the longer-term). Upgrade water, electricity and sewerage infrastructure, as well as local streets and stormwater drainage, to cope with the additional demand. This will be the responsibility of LMs, as part of their spatial planning responsibility; however, it will also require financial and technical support by provincial authorities.
    - Assist the local business sector, particularly through Business Chambers, to understand and respond to new opportunities posed by SGD. Where such chambers do not exist, they need to be established by municipalities and the business community working together. National and provincial guidelines by Departments such as Co-operative Governance and Traditional Affairs will be required to assist municipalities.

11.4 Impact 2: Safety and security

11.4.1 Description

SGD may reduce physical security in Karoo towns, due to an influx of outsiders in a context of fragile local households and networks. This follows extensive evidence of social disruptions in resource towns generally, and SGD towns more specifically, elsewhere in the world.

"Physical security" is here defined as a range of issues which can affect people's sense of stability and safety. This involves a combination of empirical facts (e.g. crime rates) and people's subjective sense of quality of life, including environmental impacts, heavy truck traffic, noise and light pollution, traffic accidents, perceived declines in liveability, loss of property values, social stress, fear of crime, and anxiety (Krannich et al., 1989; Hays et al., 2015: 39). For people in small towns where crime and social disruption has always been very limited, sudden social changes and risks will be felt particularly severely.

In several studies of mining resource towns, there appears to be a strong link between crime and resource booms, due to an influx of young single men (Ruddell et al., 2014; Deller and Schreiber, 2012; Negi, 2014; Chapman et al., 2015). In particular, there is a risk that alcohol-related offences may increase, illicit drugs become more prevalent (Pershee, 2011, Christopherson and Rightor, 2011), and property crimes and domestic violence may increase. A Pennsylvania study found increasing alcohol and traffic offences, but unclear correlations regarding SGD and other forms of crime (Centre

for Rural Pennsylvania (CRP), n.d.). There may also be an increase in sexually transmitted diseases, due to more risky sexual behaviour by young men (Raimi, 2012).

There are at least five kinds of crime-related risks to physical safety which may ensue:

1. Crimes against property and people committed *by in-migrants* who cannot secure work – this could be against SGD staff as well as local people;
2. Crimes against the property of in-migrants (professional and unskilled workers) *committed by local people* who are unsuccessful in finding work, particularly if they are extremely unskilled or cannot hold down a job, particularly if they believe that in-migrants are "stealing their jobs";
3. *Domestic violence* caused by the disruption of sudden new household revenue streams, and poor spending habits of family members (e.g. excessive alcohol consumption);
4. *Increased social pathologie*s such as prostitution, in the context of many young men in the locality with income at their disposal. This, in turn, can lead to an increase in unwanted and teenage pregnancies. Anecdotal evidence of solar projects in the Karoo shows that "sun babies" have become a typical phenomenon in these towns; and
5. Crimes committed against in-migrants *by locals* as a form of xenophobia.

Nevertheless, one should not jump to conclusions. In some US shale gas counties, crime rates had increased *before* the advent of SGD; in other cases, they had increased in shale and non-shale counties. Even where crime increased in SGD counties, this may have happened because of other causal factors (CRP, n.d). In fact, other studies have pointed to falling rates of crime, unemployment and welfare dependence in a number of large resource towns (Lawrie et al., 2011, Chapman et al., 2015; Raimi, 2012), possibly due to new opportunities for local employment. "Any generic argument associating boomtowns with rising levels of reported crime needs to be treated with caution" (Chapman et al., 2015, also see Deller and Schreiber, 2012). Much of the evidence about the impact of resource towns on crime rates is anecdotal. The issue depends significantly on the level of statistical collection – e.g. by region, county or locality (Raimi, 2012). Many rural police forces have inadequate data gathering systems (Ruddell et al., 2014), so it is difficult to determine baseline conditions with subsequent trends.

In South Africa, a study of violent crime near mines showed that an increase in mining activity tends to lead to a *decrease* in crime; however, as mining activity slows down, there follows an *increase* in violent crime (Axbard et al., 2015). A potentially important link in this causal chain is migration of workers; when economic or mining activity declines, there is a risk that these workers would be left unemployed with few links to other local labour markets. A real concern is the risk of an increase in

crime in farming areas, particularly where new access roads have been built, and effective access control has been dissipated.

Other variables also affect the possible impact on crime levels: Police professionalism and tactics; where workers live (locally in single-male hostels, or further afield, with their families); and whether companies hire locally or not. People from out of town may play a greater role in crime rates, but we should not assume that an increase in crime is caused by gas workers as perpetrators - in some cases they are the victims (Raimi, 2012).

Resource-based boom communities tend to experience increased traffic incidents, including accidents, collisions, "driving under the influence", and hit-and-run offences (Pershee, 2011; Ruddell et al., 2014). It also included higher levels of traffic, number of emergency room visits, and the demand for emergency response services (Christopherson and Rightor, 2011). The large increase in heavy trucks will damage the local roads which were not designed for such traffic. This will require a clear model of co-funding by the SGD companies, to maintain the roads; if this is not in place, a significant amount of public investment will be required for reconstructing and maintaining these roads.

Increased crime and traffic tend to leave police forces overworked and stretched thin (Archbold 2013 and Ruddell et al., 2014). Additional policing will be required in SGD towns, requiring more government expenditure (Raimi, 2012). This, in turn, will place greater financial and manpower strain on other policing regions.

Increasing earth tremors and damage to buildings may also create local feelings of fear and distrust (Van der Voort and Vanclay, 2015). The process of assessing damage may be lengthy, leaving people dissatisfied and frustrated. The costs can be far-reaching, with homes needing structural reinforcement. House prices may decline, and compensation and payment mechanisms are complex.

11.4.2 Reference Case

Generally, rural areas in South Africa are characterised by lower crime levels than the large cities. In the study region, crime levels vary: IDPs in four municipalities mention that property crimes are low or decreasing, and increasing in four other municipalities (Table 4 in Digital Addendum 11A). Crimes of physical violence (murder and assault) are decreasing or are not very serious in five municipalities, but increasing in four others. The most prevalent forms of crime are alcohol and drug-related crimes (mentioned in 12 IDPs as serious and/or increasing), and sex-related crimes (mentioned in 11 IDPs). Five of the IDPs noted grave concern about the levels of crime. Six IDPs mentioned insufficient police stations, or inaccessibility of police stations, as a problem.

Traffic management is a municipal function, in terms of Schedule 5 of the Constitution. Four municipalities mentioned traffic accidents in their IDPs as a significant problem (see Table 5 in Digital Addendum 11A). Four municipalities mentioned that they have recently strengthened their traffic management capability, while three others mentioned that they have none, or insufficient, traffic management capability.

Disaster management is a provincial function, while fire-fighting is a municipal function. In practice, there is a lack of clarity regarding roles, responsibilities and funding sources. Typically, district municipalities (DMs) take some responsibility for disaster management in their jurisdictions, and some of them assist LMs to build fire-fighting capability (see Table 7 in Digital Addendum 11A). The general impression is that both these functions are poorly developed at municipal level, although some planning has been done in some cases. Typical problems include: insufficient budget, staff, skills, buildings and equipment, and slow response times, particularly in rural areas.

In the 34 municipalities included in the study, there were a total of 799[1] public safety posts on their organograms; of these, 143 posts were vacant. In six municipalities, no public safety posts have been created. In 13 municipalities, ten posts or fewer have been created. This suggests that some municipalities are either incapable of dealing with traffic or public safety issues, or their manpower is stretched very thinly. In the absence of SGD, it is likely that this profile will continue, due to municipal financial constraints.

Mitigation efforts by SGD companies would need to focus on building or providing disaster management capability. SGD-related disaster management is likely to be highly specialised, including dealing with blow-outs, fires and spills. SGD companies typically have their own disaster management teams. However, municipalities will need to liaise with these companies well in advance of actual drilling, to clarify roles and responsibilities.

Two additional factors may have an impact on local people's sense of security: the possibility of seismic tremors (which may lead to poorly-built houses collapsing), and threats to the supply of clean drinking water.

[1] Note that this is a misrepresentative figure, since five of the District Municipalities listed in the Table 6 in Digital Addendum 11A contain large areas falling outside the study area.

11.4.3 Exploration Only

In this scenario, there is likely to be a significant influx of workers, or of people seeking work. A major factor will be the degree to which local people can secure jobs, and hold down those jobs; also how many in-migrants will secure jobs, and how many will arrive and be left stranded and frustrated.

The best-case scenario will be a large level of employment of local people – either the unemployed, or people who are currently employed and can secure better skills and incomes through working for the SGD companies. This may cause a decrease in crime. The worst-case scenario will be an influx of many outsiders, seeking work, and many not being successful in finding work. Some of those people (typically single men) may remain, in the hope of finding work (either with the SGD companies or other local jobs). During the period that they are living in the local town, with few networks or resources, they may resort to crime. The most realistic scenario will probably be roughly midway-between these extreme cases.

Most Karoo towns have a very limited police force, geared to rather low levels of crime and rare cases of serious crime. The additional crimes and social pathologies brought in the wake of SGD may greatly add to the workload of police services. The South African Police Service (SAPS) will need to plan for this, in terms of larger allocations of staff, vehicles and other resources.

The exploration phase will be accompanied by traffic pressure on local roads, either by official SGD vehicles, or by workers moving in or around the town. This is likely to cause an increase in traffic violations, accidents, injuries and even deaths. In towns which are not accustomed to heavy traffic, children and the elderly may be particularly vulnerable. Local people will have increased anxiety caused by increased traffic hazards, accidents and loss of life on the roads; as well as stress due to roadworks.

A particular challenge will be disaster management. SGD will require new kinds of hazardous materials. Where spills happen, either on roads or on-site, rapid response teams will be required. Many smaller Karoo towns do not have a fire service at all, let alone any more sophisticated forms of disaster management. This will place pressure on provincial disaster management services, in terms of funding, staffing, equipment and training.

Many small Karoo towns have very limited health provision, depending either on a small local clinic or a local private doctor. Typically, injured or ill people have to be transferred to public or private hospitals elsewhere. In cases of serious injury, this could be a life-threatening situation. Government clinics may need to increase their local medical staff.

If seismic testing is done in the vicinity of towns and farm houses, people may experience damage to their structures. This is particularly likely for very old buildings (pre-World War I) as well as township houses. Not a single IDP in the study area mentioned seismic tremors as a risk. This suggests that seismic activity will be a new form of hazard for municipalities to deal with. Several municipal IDPs mention poorly constructed public housing in black townships; these houses may be prone to damage from seismic tremors, causing threats to property and physical safety. This will bring added maintenance burdens to house-owners, accompanied by a sense of infringement and resentment.

At the end of the exploration phase, there may be a decision *not* to continue with production. This will mean a sudden loss of jobs and livelihoods. A crime wave may well ensue, which could include crimes against property, people, social pathologies, domestic violence and xenophobia.

11.4.4 Small Gas

During this scenario, a steady level of employment is maintained for 20 to 25 years, providing a reliable income stream to the community. However, the loss of jobs from the Exploration Only phase may bring a higher level of crime and insecurity, which may well continue into the long-term, particularly if the local economy remains weak and undiversified.

Significantly, crime and lawlessness, even of trivial kinds (such as littering and begging), are likely to be a major disincentive for future tourism investors, and may encourage them to leave this region. This may create ripple effects in the ecotourism industry, as there may be an increase in animal poaching and attacks on tourists in isolated rural areas.

SGD will intensify the level of traffic, both of staff, heavy equipment and hazardous materials. This will add to the workload of local police forces and disaster management teams. With low-level production, seismic disturbances may continue to damage properties, placing additional financial burdens on the shoulders of home-owners.

At the end of the Small Gas scenario, SGD may be terminated, causing new rounds of retrenchments and "shocks" to livelihoods, with a new wave of criminality.

11.4.5 Big Gas

During full production, employment is likely to be increased, which may again reduce local crime. However, much depends on the level of in-migration which had taken place in the previous two

decades. Where there are a vast number of in-migrants expecting jobs, and not being successful in securing employment, a significant level of crime may continue. There have been informal reports of people seeking work in the Karoo, and being too poor to afford the travel costs to return home. They then stay on in the Karoo towns, eking out a living from odd jobs in the informal sector. This will continue to add pressure to the public safety authorities.

Under the Big Gas scenario, traffic pressure is likely to be very heavy, due to the transport of equipment and materials, as well as staff circulating to and from work. This is likely to intensify the work of the police service as well as disaster management teams. On the other hand, road construction is one of the most accessible opportunities for employment for local unskilled workers.

Seismic damage is likely to intensify, with potential dangers to properties (particularly poorly-built township houses) and human injury. Furthermore, if SGD results in contamination to drinking water (and many towns rely on boreholes located several kilometres outside the built-up area), this will cause local consternation, and it may even result in political agitation.

11.4.6 Options for mitigation of risks

Mitigation will require:

1. Proactively increasing staff at police stations, with varied specialisations, such as domestic violence, alcohol management, traffic management, disaster management, theft and murder. Steps need to be taken that new police officers are adequately trained, managed and integrated into the community. This will have budgetary implications for the SAPS. Mitigation efforts will be the responsibility of national and provincial departments of Safety and Security, at the level of strategic planning.
2. Proactively strengthening Provincial Departments of Social Development, to provide more social workers to deal with household problems, at the level of strategic planning.
3. Creating effective local labour bureaux so that employment processes can take place in a transparent, fair and professional, to prevent xenophobia, conflict and violence. This will be the responsibility of the Department of Labour, at the level of strategic planning.
4. Workforce development programs for those who might seek jobs in the oil and gas sector and related industries, such as construction, machinery maintenance, pipeline construction. This will be the responsibility of the Department of Higher Education, in partnership with SGD companies.
5. Companies can insist on high standards of behaviour by employees.
6. Strengthening traffic management systems, and constantly improve road maintenance, possibly with the support of SGD companies. This will be the responsibility of local and

DMs, with the assistance of provincial road and traffic departments. It will be required at the level of strategic planning.

7. Providing traffic training to school learners. This should be a national intervention by the Department of Basic Education, with priority given to SGD regions.
8. Rapidly up-scaling fire-fighting and disaster management capabilities at provincial and municipal level, in partnership with SGD companies.
9. Regular measurement of seismic tremors (see Durrheim et al., 2016).
10. Regular water testing and rapid response when any evidence of water contamination is detected (see Hobbs et al., 2016).

11.5 Impact 3: Altered local economic dynamics, social relations, and institutions

11.5.1 Description

This Chapter does not provide an adequate overview of local economic multipliers (this topic is discussed in Van Zyl et al., 2016). However, some consideration of local economic impacts is necessary, to prevent an impression that all impacts on the social fabric are negative or disruptive.

Local communities can benefit from several types of beneficial economic impacts:

- *Direct* impacts represent the direct increase in the number of jobs due to the spending by SGD companies, including on-site workers, geologists, technicians and other company employees;
- *Indirect* impacts measure the additional jobs and output gained in those sectors from whom the natural gas industry contracts or purchases, such as seismic and well completion companies, trucking and construction companies, and gas processing; and
- *Induced* impacts measure the additional jobs due to an increase in household and government expenditures.

The *total economic impact* is the combination of these direct, indirect, and induced effects (Kelsey, 2011:30).

A key factor affecting economic multipliers is the size and spending patterns related to land leasing and royalties (Kelsey, 2011:37). Recipients of these funding streams may or may not spend their money immediately, and may spend it outside the locality. In South Africa, this important impact will be significantly smaller, since royalties will not be payable (only land leasing will be relevant).

As boomtown conditions set in, communities are likely to experience different stages in their reactions (Jacquet, 2009:12). Initially, officials and residents may be *enthusiastic***,** as they look forward to the economic impacts of job growth and retail spending, while the possible negative impacts are either unknown or are dismissed as unlikely in their specific area. When the new workers arrive in noticeable numbers, the town may experience some *uncertainty*, and people begin to become aware of negative impacts. Divisions may emerge within the community as to whether the growth is detrimental or beneficial. As the changes speed up, the community may experience *near panic*, with people becoming confused and angry with one another. Government services are overwhelmed and quality of services declines; any prospects of increasing revenues look uncertain or remote. Finally, as the core problems are identified and planning or mitigation strategies are developed, the community *adapts* and accepts the reality of the situation. Sometimes these phases can be experienced almost simultaneously, in different sectors of the community.

The 'social disruption' thesis (England and Albrecht, 1984; Lawrie et al., 2013) argues that rapid economic and demographic changes associated with large-scale resource development lead inevitably to social and psychological dislocation and a breakdown of established community social structures. The rapid pace of development stretches services and infrastructure, can undermine a sense of community and belonging, and can contribute to problems such as drug use, crime, alcohol abuse, domestic violence and suicide (Chapman et al., 2015; Deller and Schreiber, 2012). Socio-psychological impacts can be pervasive and diffuse, and can include an increased sense of insecurity, uncertainty, injustice, anger and family stress (Loxton et al., 2013; Shandro et al., 2011), either during the start-up phase or during a later down-turn. These, in turn, can affect the motivations, goals and decisions of community members.

An influx of temporary workers (often predominantly composed of young men) can negatively affect community cohesion, increase the cost of living, and be associated with higher levels of alcohol and drug use, mental illness and violence. Such negative effects typically fall disproportionately on community members least able to bear them (MEDACT, 2015:18.) An extensive literature (cited in Jacquet, 2009) shows that boomtowns are often associated with higher mental health caseloads, crime, divorce, suicide and alcoholism, as compared to non-boomtowns. Rapid social change, uncertainty, the isolation of migrants' families, inadequate housing and poor services are typically regarded as the causes of such dysfunctions, and this increases the demand for mental health services (Raimi, 2012). Currently, health clinics are very inexperienced in dealing with mental health issues.

The threat to social stability is a wide-ranging phenomenon, which can take different forms in different situations. It can also affect various groups in very different ways. Social disruption affects in-migrants as well as the local community members.

Employees who are long distance commuters may remain on the worksite ("man-camps"), where all accommodation, meals, entertainment and other amenities are provided. They may work for the SGD companies, or for non-SGD services such as catering, transport, or drilling. Very often (but not always), these migrants are male. For the commuters themselves, the system of single worker migration can be positive (e.g. extended leave, no interruption to family's residence, it does not affect their children's education, high incomes, camaraderie, interesting work, career opportunities), but also negative consequences (loneliness, marital strain, anxiety and possible alcohol abuse). Facilities may be better during the operational phase of a SGD operation, but rather primitive during the construction phase (Misan and Rudnick, 2015).

Local communities would experience a rapid influx of newcomers, with different values, habits and needs. Social change takes place rapidly: A relentless increase in traffic may worsen their sense of physical insecurity, and face-to-face relationships become more distant (Jacquet, 2009). Towns are suddenly flooded with strangers. Inflationary pressures may affect the poor, including the elderly (Jacquet, 2009). Young people may face mixed impacts, with greater job opportunities, but also increased crime and overcrowding of schools. Marginalisation of local people can take place, on account of their lack of experience in mining activities (Negi, 2014).

In boomtown conditions, tensions can arise between new in-migrants and old-timers, and a sense of bifurcation between the two groups can develop. Newcomers often bear social hardships, including substandard living conditions, stress from moving to a strange and isolated community, and social isolation from hostile old-timers (Jacquet, 2009:20; Pershee, 2011; Filteau, 2015).

An important aspect of increasing inequality is raising prices of local commodities, notably food, housing, services and strategic items (such as car parts). This affects all local residents, including those who do not earn the higher wages paid by the shale gas companies (Christopherson and Rightor, 2011:359). Over time, those people involved in the wealth boom can ride out these price increases, or can even benefit from them; other community members tend to experience an erosion of their incomes. Landowners who lease their properties to shale gas companies would gain financial rewards; their neighbours may only experience the inconveniences (Raimi, 2010). Those landowners who signed leases in the earlier stages may have weaker deals than those who held out until later (Brasier et al., 2011). Property owners who rent out accommodation are likely to have a rapid increase in

revenue. Uneven distribution of benefits and costs from drilling activity has the potential to create divisions within communities (Raimi, 2010; Chapman et al., 2014).

In some cases, SGD pits neighbour against neighbour, as people disagree about whether or not to drill in a local community. These divisions have the potential to sour friendships and divide the community (Raimi, 2012). In some cases, disputes over drilling have led to lengthy and costly lawsuits, hardening local social divisions. These lawsuits are sometimes between neighbours; in other cases, lawsuits arise between local communities and drilling companies. Divisions may develop between farmers who intend to collaborate with SGD companies (e.g. selling or leasing their land), and those who do not intend to do so (Brasier et al., 2011). All farmers, including those who have not sold or leased their land, may experience inflationary pressures.

The rapid influx of people tends to loosen social ties, with a constant population churn. Most workers, and particularly families, tend to stay in the region for only as long as a job lasts and then move away because housing costs erode the high wages. Community leaders complain that there is limited sense of community commitment, thus contributing to a sense of transition and 'shallowness' (Chapman et al., 2014). In rural communities, farmers may also perceive a threat to their social status as the most culturally and economically significant sector of the community (Jacquet, 2009).

The social disruption thesis became accepted as 'conventional wisdom'. Over time, however, an increasing body of work has emerged that has challenged the findings reported in these early studies, pointing to weak empirical evidence and an over-reliance on single-town case studies (Lawrie, 2011). As reiterated above, local circumstances can vary dramatically. The sense of social disruption may not be shared by all local people, and it may not remain at the same level over time (Brasier et al., 2011). Boom and bust periods may be followed by a recovery. As development evolves, many community members may adapt, leading to new phases of economic development. Indicators of wellbeing, such as community satisfaction, trust in other community residents, and social ties, may rebound to pre-boom levels. Communities may develop a new sense of identity, based on an acceptance of new local conditions.

Curiously, SGD has also united communities in some areas (Raimi, 2012). In communities where leasing activity has begun, neighbours have joined together in land owner coalitions. Some of these coalitions negotiate lease terms on behalf of their members, resulting in better monetary outcomes, improved property rights protection and stronger environmental safeguards. But while this is beneficial from the point of social cohesion (at least for land owners), it also increases the level of

inequality between those who benefit from SGD (e.g. employees or landowners) and those who do not benefit (Jacquet and Stedman, 2011:84).

Where interaction amongst local community leaders is inadequate or minimal, or local institutions work in silos, then it is much more difficult for communities to adapt to rapid changes or shocks (Wasylycia-Leis, 2014). The in-migration of workers on shale gas projects may contribute to new forms of social cohesion, in terms of local friendships and intermarriages, between workers themselves (and their families), and between workers and local people (the "melting pot syndrome") (Onoh, 1997).

11.5.2 Reference Case

Small towns in the study area vary greatly in terms of their "social fabric". However, there are some similarities. Typically, the towns consist of a small middle class, including white entrepreneurs or retired people, as well as black or coloured government officials and a few emerging black entrepreneurs (typically in sectors such as retail and transport).

Figure 11.2: Central business districts in Karoo towns.

Race relations in many rural towns are fairly settled, with racial social status differences still remaining, but some degree of practical co-operation across racial lines within government departments or private work places. There are still very few cases of spontaneous friendships across the colour line, and even fewer cases of intermarriage between white people and black or coloured people. Commercial agriculture is still largely constituted by white farmers, and local Agricultural Unions are almost exclusively white. "Emergent" or aspiring small-scale black or coloured farmers

tend to have their own agricultural associations, based on their common interest as commonage farmers.

The working class is largely black, but there are also white employees who generally earn fairly low salaries, which do not compare with urban salaries. Some white people are beginning to experience poverty and even destitution. All race groups have significant numbers of elderly living in these towns, drawing state pensions, which are often used to support children and grandchildren. The government "grant system" is a critical factor supporting local livelihoods.

Due to the amalgamation of municipalities in 2000, the erstwhile local leadership structure in each town (Mayor and Council) has fallen away. Although local towns are represented on the Municipal Councils by means of Ward or proportional representation (PR) Councillors, many Councillors' performance has been poor, so that townsfolk have very little effective representation in municipalities and there is little municipal responsiveness to local needs: "Many challenges have been identified with respect to governance. These include a lack of political leadership, political interference and patronage. There is also a demanding policy agenda, complex reporting demands and a weakening of institutional abilities in many municipalities" (Van der Byl, 2014:30). Municipalities are not geared for dealing with sudden, rapid or large-scale investments or social upheavals. Municipal projects are typically infrastructure-driven, funded by national government (such as water or sewerage projects).

Party-political structures are typically weak, and are only activated at election-time. At such times, there is often a great deal of mutual suspicion and animosity between contending political parties. To some extent, this is influenced by racial divisions, with the ANC being largely black, and the Democratic Alliance (DA) being largely white and coloured. Party-political competition therefore has the likelihood of enhancing racial cleavages.

Towns in the eastern part of the study area have traditionally been predominantly isiXhosa- and English- speaking; those in the west were predominantly Afrikaans speaking. There has been a growing influx of isiXhosa-speakers into the western regions, with the erstwhile dominance of the Afrikaans language gradually becoming undermined. In this situation, English is becoming an increasingly important *lingua franca*, particularly where government institutions are involved.

Almost every town has foreign traders, whether from China, northern Africa, India or other Asian countries. Generally, they are well tolerated because of their hard work and business acumen. However, there may be underlying resentment that these traders have undercut, and often squeezed

out, the local African informal "spaza" traders (Figure 11.3). In South Africa, there have been severe cases of xenophobic violence; however, this has not taken place in the study region.

Figure 11.3: Informal traders

The growing class of tourism providers, often undertaken by investors from the cities (typically white South Africans) has added a degree of sophistication and even cosmopolitanism to South African small towns. They have also created employment, often of a higher status and with higher wages than traditional small-town occupations. The slow but steady influx of "semi-grants" (people who move from cities to rural areas) has been stimulated by various factors, such as the architectural charm of many towns, as well as the opportunities offered by the hospitality, arts and crafts, and cuisine trades (Figure 11.4).

Figure 11.4: Tourism investment in the Karoo

In towns where middle-class schools have closed down, many white and black middle-class children are sent to larger centres to better schools. The rural towns which host such schools do conspicuously better, both economically and socially, than the towns without such schools. Many parents do a great

deal of their own shopping and business in the larger towns when they transport their children to boarding schools; this undermines the local economies of the smaller towns. This has led to a class-based bifurcation between middle-class schools (for black, white and coloured children) and working-class schools (typically black or coloured).

As in almost all rural towns in South Africa, poverty rates are high. Poverty rates range from highs in the 40 - 60% range (seven municipalities) to those in the 30% range (six municipalities) (see Table 8 in Digital Addendum 11A)[2]. The Human Development Index (HDI) ranges from 0.46 in the Ngqushwa LM (Peddie area) to 0.67 in the Makana LM (Grahamstown). Most HDI rates are within the 0.5 and 0.6 ranges. Dependency ratios (non-working age population dependent on working age population) range from 44.1% in Makana LM to 81.8% in Emalahleni LM (Dordrecht/Lady Grey). All these indicators suggest that the public authorities already have a major challenge of dealing with poverty. However, many areas have seen an improvement in poverty rates; this is generally understood to be a result of the roll-out of social grants.

There are high levels of inequality in the study area, ranging from Gini 0.54 in Breede River Valley LM (Worcester area) to 0.63 in Inkwanca LM[3]. More significant is the racial profile of HDI levels. In the Cape Winelands District, for example, the general HDI of 0.65 is a composite of 0.52 for black people, 0.66 for coloured people and 0.86 for white people (Cape Winelands, 2014). There are also locational inequalities: in Tsolwana LM, for example, the HDI for Tarkastad is 0.51 while that of Hofmeyr is 0.44 (see Table 8 in Digital Addendum 11A). South African towns are highly unequal, within their communities as well as in comparison with one another.

Social services are typically very constrained; for example, only four out of 15 social worker posts were filled in 2010 in the Camdeboo LM (Graaff-Reinet area; Camdeboo, 2015). Social capital is fairly weak. Rural towns typically have numerous church denominations, although many congregations in small towns are weak and without permanent clergy living in the town. Non-governmental organisations (NGOs) tend to be few and far between, although some Karoo towns have remarkably innovative and successful NGOs. Typically, their work is limited to one or two towns. Schools and clinics are fairly well developed in the study area, although the quality of these institutions may vary from town to town.

The general impression of rural towns is that much of apartheid South Africa still exists here, although it has been slowly altered by the rise of black and coloured officialdom, a new "emergent"

[2] Information not available for all municipalities.
[3] Information not available for all municipalities.

black bourgeoisie, the influx of more liberal values associated with tourism providers, and the recent arrival of renewable energy companies in many small towns.

11.5.3 Exploration Only

The rapid influx of professionals will strengthen the local hospitality industry by providing a regular cash flow to accommodation enterprises – an issue dealt with more fully in Toerien et al. (2016). This will stimulate businesses and job creation, because of their spending on food, housing, recreation and other household needs. These multiplier effects are profoundly affected by where workers live, and particularly, where their primary household is located, as this would determine the level of household remittances (Kelsey, 2011:17). The economic impacts of employment of locals differ significantly from employing migrant workers, due to different levels of local multipliers.

The percentage of people with post-matric qualifications ranges from 4% in Sundays River LM (Kirkwood/Paterson) to 12% in Makana LM (Grahamstown). These people may have good access to SGD jobs; however, the numbers are small, and this would give rise to greater levels of inequality. It would also require an inflow of additional professionals to fill all the required SGD posts.

The international phenomenon of growing divisions amongst land owners is likely to take place in the Karoo. Those landowners who host SGD companies, and secure attractive lease incomes, may well favour SGD, but they may be challenged by those farmers who do not benefit in this way. There are also likely to be ideological contestations about the desirability of SGD, based on intense debates which have already started (Ingle and Atkinson, 2015). Small towns in South Africa are often deeply divided about the desirability of infrastructural and other developments (Ingle, 2012), with some tourism entrepreneurs preferring to keep the rural ambience of their towns. Also, the influx of professional employees may cause recreational tourism to decline, and may also lead to a decline in accommodation quality and standards.

While exploration will attract a significant corps of highly trained professional staff, the most dramatic social upheaval is likely to be caused by in-migrant work-seekers. In the South African context, this may be called a “balloon-town” phenomenon (work-seekers who do *not* manage to secure work, but remain in the vicinity), in contrast to conventional analyses of “boomtowns” where in-migrants do indeed secure jobs on the new projects. Where such in-migrants do not secure work, this may well contribute to local problems of prostitution, teenage pregnancy, HIV and alcohol abuse. This will place added burdens on social services.

A growing degree of xenophobia is very likely, if people from other cultural areas migrate to the SGD towns to take advantage of jobs. Educational levels in the study area are generally low: Matriculation levels range from 11% of the adult population in Emalahleni LM (Dordrecht/Lady Grey) to a high of 25% in the Breede River Valley LM (Worcester area). It is not clear that these matric-holders will be able to compete with incoming job-seekers (see Table 8 in Digital Addendum 11A).

11.5.4 Small Gas

A key factor will be the likely growth in employment, for locals as well as outsiders. A US study found that approximately 75% of the natural gas industry's direct workforce is comprised of occupations that require little formal post-secondary education and relatively few trade certifications. However, these jobs depend heavily on the experience and acquired skills and knowledge unique to the natural gas industry. Finding workers with the unique skill sets, knowledge, and work ethic gained from experience in the gas industry remains a significant barrier to finding adequate local workforces. Initially, a large portion of natural gas industry jobs will be filled by non-local workers; however, over time nearly all of these jobs could potentially be filled by local workers (Brundage et al., 2011).

In the US, blue collar and white collar skills within local communities are often inadequate for SGD, and this required a strong focus on expanding local training options. In one Marcellus Shale study, 40% of workers needed a trade or industrial certificate, while 27% needed a technical college degree. Only 15% needed no previous training (Brundage et al., 2011). Over 150 different occupations were needed. In the rural Karoo regions, training opportunities are currently highly inadequate, and would have to be expanded rapidly in order to enable local people to benefit from job opportunities.

In US shale gas operations, the inherent uncertainty of SGD means that many workers remain only transient residents of a development location (Brundage et al., 2011). This constant churn of outsiders may generate or exacerbate racial schisms (within the local community) or xenophobia (towards in-migrants).

Some local people may develop good relationships with SGD companies, either as landowners, or as employees or service providers, and will continue to strengthen their economic position. SGD will bring a financial windfall to hospitality providers. Accommodation providers will have revenue to expand and upgrade their facilities. It could also stimulate more local property owners, in towns and on nearby farms, to make available rooms for rent and they will also share in the windfall. With the lucrative market for rental housing, there may be an increase in property values as local residents expand their accommodation services, or people from elsewhere move to the town to purchase or establish guest houses. This may stimulate a further round of investment in the construction industry,

as more housing stock is built. Other local industries will benefit as well, notably retail, food, transport and recreation.

In the South African case, it is not clear what benefits will accrue to land owners, in terms of rentals. In the USA, rentals and royalties have been a major income flow to local communities (although it exacerbated inequalities, and was not necessarily spent within the local area) (Kelsey et al., 2011:11). In South Africa, mineral rights are owned by the state, and therefore landowners are likely to benefit from leases, but not from royalties. However, given that most commercial farmers are white; this may arouse local racial resentment amongst nearby black communities. The benefits accruing to some community members may give rise to envy and resentment on the part of local community members who are not as privileged. This may take the form of racial tensions, if white people are more fortunate in securing SGD jobs, tenders or contracts.

11.5.5 Big Gas

As in the Small Gas scenario, the problems associated with the inflow of employees (typically men), will continue; social and economic inequality will intensify, and local tensions may take the form of racial schisms (within the local community) or xenophobia (towards in-migrants).

Some local people will develop good relationships with SGD companies, either as landowners, or as employees or service providers, and will continue to strengthen their economic position. This may give rise to envy and resentment on the part of local community members who are not as privileged.

Given several decades of experience with SGD, these towns may develop a new identity and forms of social cohesion which provide stability, as well as a platform for future growth. These towns will lose their original character, but will become consolidated economically and socially based on a new sense of place.

11.5.6 Options for mitigation of risks

Mitigation will depend profoundly on building local leadership, governance and NGOs to identify and address potential social challenges. It is critically important that we learn from the renewable energy towns about the unintended social consequences of "boomtown" experiences. This will require:

1. Companies to proactively adopt policies and report measures to curb corruption or bribery, and promote financial transparency (IPIECA et al., 2015).
2. Departments of Social Development should provide guidance to municipalities and NGOs to manage new challenges. There should be a much greater degree of collaboration

between NGOs, churches, government departments and municipalities, to address issues such as prostitution, teenage pregnancy and alcohol abuse. The creation of local committees consisting of SGD companies, municipalities and other stakeholders will be required. This would be a region-wide intervention, and require strategic planning by the relevant Department, NGOs and municipalities.

3. Different languages will need to be utilised in community engagement processes, to match South Africa's multi-cultural social contexts. At a minimum, Afrikaans and isiXhosa will be required to complement English. It would be the responsibility of SGD companies to promote effective communication.
4. Due to the significant diversity amongst towns, in the quality and nature of their social fabric, town-based monitoring and community engagement will be required. Regional engagement processes will not be sufficient. This would be the responsibility of municipalities, under the guidance of provincial Cooperative Governance and Traditional Affairs (COGTA) departments.

These issues are addressed more fully in the section on Best Practice below.

11.6 Impact 4: Governance, power-holders and gate-keepers

Rapid SGD can increase the nature and level of risks faced by municipalities (Jacquet, 2009). Municipalities are subjected to a wide range of demands for new or expanded services, and the administrative capacity, staffing levels, equipment, and outside expertise needed to meet those demands may be beyond anything that has been budgeted (Christopherson and Rightor, 2011). In particular, road maintenance is likely to be a heavy burden (Kelsey, 2011:28).

There are two dimensions of government capacity which will be critical to management of SGD: Engagement with the SGD process itself, and management of the social consequences of SGD. While the SGD technical issues are analysed elsewhere in this scientific assessment, they are important for the social fabric because of the demands they would place on already overburdened municipal and government officials – which may lead to poorer service delivery in other sectors.

One of the major problems facing policymakers is that once an SGD project is approved, development often proceeds at a pace that exceeds the ability of governments to keep up with necessary service and infrastructure needs. This can contribute to social dislocation and, at least in the short term, a decrease in the local standard of living. Government agencies are often unwilling to commit to the upgrade or provision of new infrastructure and services until the company involved has full regulatory approval and financial certainty. As regards housing and land provision, there is also a difficulty of

synchronising development phases: if the local government releases large areas of land prior to the project being approved they could over-supply the market and contribute to a crash in local property prices. In boomtown conditions, municipalities tend to have insufficient control of land use, due to central government regulations. The provision of social, economic and cultural services and infrastructure is complex, and often hindered by governmental agency structures, project complexity, competing demands and priorities, and remoteness. Very often, municipalities will not engage in preventive planning, so that their funding will almost exclusively be used for reactive programming – i.e. in response to problems that have already occurred. Also, municipalities often have to bear the brunt of new service demand immediately after mining development, but the expected revenue does not arrive until much later, either from local taxation or government grants (Jacquet, 2009; Chapman et al., 2014).

Municipal and government planners are additionally disadvantaged because rapid mining developments are often accompanied by an unequal distribution of information. The SGD companies will exert tremendous power over the pace of development and the amount of information that is available to planners; sometimes, an incentive to misinform exists (Jacquet, 2009).

It is also not clear that municipal revenue will increase from SGD. In countries with SGD experience, the municipal fiscal system may differ significantly from South Africa. Even in Pennsylvania, only 18% of 131 municipalities (i.e. 23 municipalities) reported higher revenues, either from Income Tax, Property Rates, local services taxes, or permit fees) (Kelsey, 2011:27). Given that South African municipalities only derive income from property taxes, service fees (mainly water, sanitation and electricity) and national subsidies, the municipalities may benefit little from the sudden economic windfall, at least in the short term. Significantly, income tax is not payable to the local government level in South Africa.

Even when municipal revenue increases, in the wake of boomtown conditions, municipalities may be hampered by laws restricting the use of the funding, staff shortages or inexperience, lag-times involved in large capital facility construction, and the public unwillingness to change long-standing local policy. Many rural areas historically have had little need for a highly educated and experienced planning staff, and quickly acquiring such a staff can be difficult and even controversial (Jacquet, 2009). Administrative costs for a range of planning, permitting, monitoring, and enforcement activities rise, as do the demands on the police, courts, jails, health services, fire and emergency services, and social services. All these services may require new equipment and training (Christopherson and Rightor, 2011). Community health nurses often have to engage with a range of new issues, such as water and air quality, water testing, and new kinds of diagnoses and referrals.

Municipalities must learn to plan, zone, negotiate with industry, evaluate different people's needs for compensation, figure out new laws, and revamp their infrastructure and services. They must learn to work with new types of people. Over time, municipalities may become more sophisticated, providing new services and facilities, and bureaucratise government systems (Jacquet, 2009).

SGD companies may contribute to municipal services, such as road maintenance and disaster management. However, a significant factor will be the length of time spent on constructing and operating a wellpad; if the impacts are short-term, then symbiotic relationships with LMs are less likely.

Impacts do not only occur at a locality level. Towns which do not have drilling operations, or where such operations have ended, may still be affected by neighbouring truck traffic, gas storage facilities or pipelines. These more widely distributed impacts need to be taken into account when anticipating what impacts SGD will have on communities (Christopherson and Rightor, 2011; Jacquet, 2009). This creates jurisdictional challenges.

In some cases, municipalities lose some of their skilled and experienced employees to private-sector jobs in the gas industry. That adds to the cost of recruiting and training new staff, and the need to increase salaries to attract or retain them (Christopherson and Rightor, 2011), at a time when the municipal revenue has not increased significantly.

The new SGD companies need careful supervision and monitoring (such as water quality and environmental health), which creates more pressures on public agencies (Pershee, 2011). If adequate monitoring is unavailable, it may create the risk that a breach at the waste sites could go unnoticed for months, increasing dramatically the risk and scope of potential harm. Even with funding for additional positions, it takes time to find, hire, and train new officials. New kinds of disaster management may be required. Dealing with abandoned wells poses additional problems for public authorities, and the costs may eventually be borne by local taxpayers (Sovacool, 2014). At issue are the kinds of public regulations, as well as their enforcement.

Not only do boomtown conditions impact on municipalities' administrative challenges, but they may also heighten political tensions. Local communities may well be divided about the merits of SGD. Typically; they may trust different sources of information on what is occurring. In the mining sector, the intensified awareness of resource depletion and the environmental and climatic impacts associated with mining activities have prompted debates on social negligence on the part of mining companies

(Gyapong, 2013). This creates a fractious political environment for local officials (Christopherson and Rightor, 2011). Local disagreements about SGD can lead to new schisms and conflicts, with politicians, businesspeople, economists, geologists, engineers, environmentalists, opinion-makers and local residents taking sides (Kenarov, 2013; Jones et al., 2013; Van der Voort and Vanclay, 2015; Vesalon and Creatan, 2015). Local protests about SGD may meet with strong or even excessive police force, giving rise to social anger, frustration and demoralisation (Short, 2015).

Energy booms often bring concerns about bribery, corruption and fraud. The mineral leasing process typically involves experienced business people on one side and inexperienced farmers and municipalities on the other. This raises the risk that energy speculators will take advantage of local people (Pershee, 2011), or that such perceptions are created, thereby detracting from municipalities' legitimacy. There has also been a surge in the prevalence of community protests in mining-affected communities across the world (Murombo, 2013; World Bank, 2010).

Corruption (or bureaucratic rent-seeking) has various negative impacts on local or national economies, including a greater development of bureaucratic regulations, and a tendency for poor project selection (Leite and Weidmann, 1996). Some theorists argue that there is a proven link between resource abundance and corruption (Papyrakis and Gerlach, 2007; Agbese, 2015). Natural resources provide an easy way of receiving "rents" (payments, kickbacks or bribes), and increase the returns to bribing the administration in order to gain access to these resource rents (Mauro, 1998; Gray and Kaufman, 1998). Politically powerful interest groups, linked to natural resource development, may attempt to influence politicians prone to corruption in order to adopt policies that may favour particular interests as opposed to the general public interest. Since abnormal profits are available to those who extract natural resources, officials who allocate extraction rights may be offered bribes. Corruption also tends to be self-enforcing: once a corrupt system is in place, individuals have no incentive to try to change it (Mauro, 1998). Because of their sizeable local investments, mining companies can exert a great deal of local power and influence (Tonts et al., 2012; McDonald, 2012). Sudden and unannounced operations closures can have a major impact on local multiplier effects and viability of enterprises.

The way in which SGD companies engage with local communities can have a significant impact on the local social fabric. At one extreme, companies can keep themselves isolated; at the other extreme, they can join and share decision-making processes and community projects in good faith. They may also become involved in rent-seeking arrangements with public officials (Garvie and Shaw, 2015). SGD companies may well have networks at national and provincial government levels that would effectively override local leaders and interests. Companies' behaviour is determined by company

policies as well as the decision-making style of local mine managers; in particular, their CSR policies and practices have a direct effect on local communities (Wasylycia-Leis et al., 2014; Garvie and Shaw, 2015). In practice, CSR is influenced by numerous factors, including local situations, company culture, the strength of stakeholder demand, local leadership, the scope of environmental and social concerns, and past environmental incidents related to the mining sector in the region (Kotilainen et al., 2015). It is therefore difficult to generalise about company-community relationships.

Typically, mining companies attempt to secure a "social license to operate" (SLO) through various community initiatives, including charity, infrastructure improvement, health programs, support to local businesses through procurement policies, and sustainable livelihood projects (Kotilainen et al., 2015). Some mining companies employ a range of professionals, including anthropologists, health professionals, and development workers (Kapelus, 2002). The "machinery of CSR" now often includes divisions for community affairs, public relations, SIAs, and public involvement programmes (Kapelus, 2002). Companies' interactions and support for local community groups may create dependency relations (Kotilainen et al., 2015), or relationships of patronage and clientelism in the local community (Rajak, 2012). This may reduce local leaders' willingness to monitor companies' local activities or enforce regulations. Where communities feel powerless, they may develop a sense of lethargy and fatalism (Garvie and Shaw, 2015). Power relations between companies and local communities may remain highly unequal (Garvie and Shaw, 2015:2).

A potentially significant countervailing power may resort in coalitions of land owners, who negotiate jointly with gas companies to secure good leases. They may also be public-spirited: In New York State, these coalitions have insisted that shale gas companies improve their environmental monitoring and management, and that infrastructure is planned to promote local benefit. They have also taken gas companies to court when regulations or agreements have been violated (Jacquet and Stedman, 2011).

11.6.1 Reference Case

Municipalities in South Africa have been frequently characterised as weak institutions. In fact, they vary significantly, from fairly competent and professional agencies to poor and chaotic administrators. There are 34 municipalities in the study area, of which seven are DMs. Typically DMs contain, in their jurisdictions, several LMs. Their functions vary: most LMs are responsible for water, sanitation, electricity, streets, sidewalks, and other basic services, with DMs responsible for regional-level planning, regional roads, environmental management and disaster management. Often, the allocation of powers and functions is unclear, and municipalities tend to rely on a range of *ad hoc* service agreements amongst DMs and LMs to implement their functions (See Digital Addendum 11B for provincial and municipal powers and functions).

The pressures and strains on municipal government have been frequently asserted and analysed (for example, Van der Byl, 2014). Over the last twenty years, local governments have had to extend infrastructural and social services; at the same time, there have been two major structural transformations (1996 and 2000). They have had to develop a new generation of local government managers and professionals, while at the same time losing the institutional memory and skills of the apartheid generation (Solomon, 2008:41). They have had to deal with new legislation, policy and programmes in numerous sectors. An added difficulty is that municipal boundaries are set to be changed yet again after the 2016 municipal elections. These changes will require a great deal of organisational adjustments, causing significant confusion in the short-term, and possibly dysfunctions in the medium-term. In the study area, all the relevant changes are in the Eastern Cape, where ten municipalities will be consolidated into five.

Typical problems faced by municipalities include very limited revenue (small tax bases), a dependency on government grants for operational and capital expenses, understaffed administrations (sometimes combined with bloating in certain departments), inexperienced and insufficiently qualified officials, conflicts between municipal officials and councillors, and sometimes, suspected or proven corrupt practices. However, one must be wary of generalisations, as there are municipalities which have consolidated their performance over time.

Figure 11.5: Some municipalities have vibrant participatory processes.

Audit opinions (by the Auditor-General's Office) provide a useful indication of municipal capacity (see Table 9 and Table 10 in Digital Addendum 11A). Audit reports do not only concern financial

management. The 2012 Auditor-General's report noted that, in South Africa, "At least 73 percent of the auditees showed signs of a general lack of consequences for poor performance … modified audit opinions remained the norm. When officials and political leaders are not held accountable for their actions, the perception could be created that such behaviour and its results are acceptable and tolerated. More than half of the auditees can attribute their poor audit outcomes to mayors and councillors that are not responsive to the issues identified by the audits and do not take our recommendations seriously" (Van der Byl, 2014:34).

A total of 20 municipalities are rated as Excellent or Good; of these, 14 have improved in the last three years, while six have retained a constant course. Of the 16 poorly rated municipalities, four have improved (from extremely poor), ten have remained constantly poor, and two have deteriorated. In 2014, about one-twelfth of municipal posts were vacant (see Table 11 in Digital Addendum 11A).

For all the municipalities combined, in this vast region, there were only 142 environmental protection posts available in 2014, with 26 vacancies. For health management, there were 221 posts available, with 36 vacancies. For public safety, there were 799 posts available, with 143 vacancies (see Table 12 in Digital Addendum 11A for the municipal comparisons). Of course, it is not clear that the posts that are indeed filled will have the requisite skills, funding or equipment to function optimally.

Without SGD, a slow process of municipal capacity-building is likely to ensue, although there may be municipalities where deterioration may set in again, due to a lack of political leadership or a culture of corruption.

11.6.2 Exploration Only

Additional traffic will place significant pressure on rural and inter-town roads. Already, municipalities are facing severe road maintenance backlogs (see Table 12 in Digital Addendum 11A). A lack of finance, staff, skills and equipment already creates an almost universal problem of road maintenance. SGD will also place an additional load on environmental and waste management and environmental health staff, which is already thinly stretched (see Table 13, Digital Addendum 11A).

The dynamics between SGD companies and LMs are difficult to predict, and may vary from collegial co-operation to side-lining, manipulation or undue influence. Given the intense rivalry between political parties at municipal level, it is possible that SGD companies may – deliberately or not – become involved in these loyalties and rivalries.

11.6.3 Small Gas

These scenarios are likely to continue and intensify, and could vary greatly between one municipality/company and another. SGD taxation revenue will not contribute to the municipal revenue coffers, since they will not be ratepayers. Companies may need to purchase water from municipalities, which could result in increased municipal revenue, if water is priced suitably. This may place municipal water supplies under great strain. Dealing with possible environmental problems associated with SGD will also place strain on the limited resources of municipalities. In South Africa, SGD may gradually benefit municipal revenues if it stimulates new housing construction (for SGD staff and people attracted to support industries), as it would contribute to property rates.

11.6.4 Big Gas

By now, there could be ongoing support by national and provincial governments for municipalities, in their planning and management systems, and in dealing with SGD challenges. However, this positive scenario could be undermined by undue influence of SGD companies at national level, which could filter down to municipal level as well, possibly through party-political channels.

Some municipalities will build the capacity to manage SGD environmental health and road management challenges, but these are likely to be in a minority.

11.6.5 Options for mitigation of risks

There are already significant Community Investment guidelines drafted by international development agencies (e.g. IFC, 2010), which will need to be read and understood by local SGD companies as well as other stakeholders (such as municipalities and provincial government departments).

The ability of local governments and economic development organisations to build on the presence of the mine while it is in operation, by introducing long-term development strategies, can dramatically alter the short-and long-term impacts of the mine (Deller and Schreiber, 2012). SGD companies will need to take special efforts to engage municipalities and offer to assist them in crucial functions, particularly to prevent growing backlogs in approvals and infrastructure maintenance. Key steps have been proposed to empower municipalities to deal with the SGD challenge (Christopherson and Rightor, 2011):

1. The need for baseline data on roads, water treatment, rents, traffic, use of government equipment, water quality, and so forth, to hold companies and contractors accountable for the increased cost to local services that their activities generate. Without this, they

cannot make a good case for relief from the companies or the state. This would be the responsibility of municipalities, at a region-wide level; they, in turn, would require the assistance of provincial departments such as COGTA, Transport and Water Services.

2. The need for a dedicated revenue stream from gas production. This may be unlikely in the South African context, since our municipalities do not receive income taxes. They depend on property rates and service charges, which tend to be fairly inflexible and slow to adjust to local changes; and municipal expenditure growth may exceed revenue growth. However, it would be possible for SGD companies to establish their own local Trusts, from which municipalities and civil society organisations can draw down grants. Ideally, the DMR should provide guidelines on this; in addition, departments such as COGTA and Social Development should provide inputs in the design of these guidelines.

3. The need to budget for future costs: the effects of SGD may last far longer than the boom in drilling activity in any given locality. A variety of budgeting instruments; fiscal impact fees, trust funds, capital reserve funds and a healthy fund balance, should be set aside to defray future costs. This would require guidance by National Treasury and COGTA.

Some traditional communities in British Columbia are now insisting on multi-year pre-development plans from industry and government, cumulative environmental assessments, the protection of culturally significant areas and resources, and third-party or independent monitoring and enforcement (Garvie and Shaw, 2015). First Nations have signed agreements directly with companies whereby the latter agreed to abide by community conditions, including extensive baseline studies, rigorous monitoring, and local participation in monitoring processes. The challenge is to get the provincial government departments to implement these requirements.

In towns experiencing booms (and busts), leadership qualities can make a significant difference in managing the impacts of rapid investments, and to plan appropriate urban expansion (Shigley, 2009). It is therefore critical that provincial governments realise the potential strain which municipalities will face, and assist municipal councillors and senior officials to identify and address new challenges.

Diversification of local economies is an important way of reducing dependence on natural resource extraction. This can happen in two ways: 1) by extending the extracted resource based value chain (both forward and backward); and 2) by building value chains across multiple industries for other extracted, cultivated and/or grown resources (such as agriculture, retail or tourism). This could

counter any fluctuations in commodity prices, as these would be different for the different products, especially where value adding happens along the respective value chains.

11.7 Risk assessment

11.7.1 Measuring risks

Impacts on the social fabric can be measured by means of several indicators. However, in many cases, an underlying *"theory of change"* needs to be clearly enunciated, to link proxy indicators with social outcomes, in purported cause-effect relationships. It is possible, for example, that the same indicator (such as jobs for in-migrants) may be linked to positive as well as negative impacts on the social fabric. It is also possible that several indicators may have contrasting impacts on a single dimension of the social fabric (for example, in-migration of professionals may support local accommodation enterprises, but at the same time, they may squeeze out recreational tourists, which may undermine tourism in the longer-term).

1. *In-migration:*
    - 1.1 Population figures, e.g. census figures;
    - 1.2 House prices, rentals, housing backlog lists (compiled by municipalities), backyard shacks, and ratio of people to houses (i.e. overcrowding);
    - 1.3 Temporary accommodation: hotel and guest house rooms, beds and occupancy rates, number of tourist-nights vs number of SGD staff-nights (this will require data collection systems launched at the beginning of the exploration process);
    - 1.4 Jobs for locals, jobs for in-migrants (this will require data collection by SGD companies);
    - 1.5 Local petrol sales as a proxy for financial inflows;
    - 1.6 School enrolment figures; and
    - 1.7 Amounts of water used locally.

2. *Public safety:*
    - 2.1 Crime levels, in various categories;
    - 2.2 Traffic accidents and rule-breaking, in various categories; and
    - 2.3 Number of cases of damaged houses.

3. *Altered social relations and institutions:*
    - 3.1 Teenage pregnancies;
    - 3.2 Clinic visits;

3.3 HIV and AIDS infection rates;
3.4 Farmers unions experiencing internal conflicts and disputes related to SGD; and
3.5 Incidents related to xenophobia.

4. *Governance:*
   4.1 Staffing levels in key municipal departments: public safety, environmental management and environmental health;
   4.2 Municipal budgets allocated to key municipal departments;
   4.3 Municipal audit reports, in various categories;
   4.4 Newspaper reports of collaborative or problematic interactions between municipalities and SGD companies;
   4.5 Newspaper reports of positive or conflictual interactions between municipalities and communities/NGOs;
   4.6 Road maintenance as a proxy for municipal infrastructure management capacity;
   4.7 Municipal involvement in dealing with environmental health challenges related to SGD;
   4.8 Annual rates and taxes as revenue stream in LM;
   4.9 Number of indigent households in municipality;
   4.10 Number of taxpayers in municipality; this is based on property ownership; and
   4.11 Incidents of public protest (Hanna et al., 2016).

11.7.2 Limits of acceptable change

The question of the social fabric is a profoundly normative one, based on every person's underlying assumptions regarding social systems, values and practices. Consequently, there is likely to be a great degree of controversy about the limits of acceptable change. At one extreme, a conservative view will regard any changes to the inherited social fabric in these rural towns as unacceptable; at the other extreme, people may be willing to contemplate a large degree of change, in the expectation that such changes will be constructively managed to secure beneficial outcomes.

This assessment attempts to pose limits which are roughly midway between these extremes:

1. Some degree of in-migration is acceptable, as long as it does not place the local housing market under severe strain. If there is some strain, it may kick-start private investors to expand their housing stock, which may benefit these towns in the long run. However, such housing expansion will need to be phased in a careful way, to prevent extreme pressure on the

existing infrastructural systems – which are already under strain. The most beneficial scenario is that in-migrants are accommodated in accommodation establishments (e.g. hotels, guest houses), or in man-camps. New building construction may also undermine local architectural heritage.

2. Local employment can be boosted by creating labour exchange offices. A fair and transparent hiring system will reduce social tensions and possible xenophobia. Proactive training opportunities will also help to balance supply and demand for labour.

3. Improved levels of policing, disaster management and traffic management must be achieved in order to cope with waves of in-migrants and local social pathologies.

4. Farmers associations and churches are likely to be much divided in their response to SGD, particularly where some land owners or service providers can benefit from deals with SGD companies. Given that these institutions are almost the only real forms of civil society in these rural areas, such divisions may sour local relationships for years to come, and thereby reduce the resilience of communities to deal with SGD or other problems. A limit of acceptable change may be described as preparedness for increasing conflicts, by creating or supporting local consultative institutions.

5. Racial tensions still exist under the surface of rural communities. Where some racial groups feel that they have been systematically disadvantaged by SGD, it is likely to increase these divisions, and this may lead to physical conflict or violence. This is clearly beyond an acceptable limit of change, and proactive steps will be required to illustrate fairness in employment and benefits.

6. The poorer sectors of the local communities are already facing problems of family violence, alcohol and drug abuse, and sexual crimes. Many families are very vulnerable, with young women particularly prone to abuse by single men. An influx of male workers is likely to exacerbate this situation quite quickly, as the experience of the solar and wind energy projects have shown (a phenomenon of "solar babies" born to unwed young mothers). These problems are likely to show themselves quite quickly after SGD operations begin. There are no clear pre-emptive measures that can be taken to prevent these problems. Hence the limit of acceptable change will be reached very quickly, unless vigorous pre-emptive steps are taken to support households in distress.

7. The poor condition of roads, combined with poor maintenance practices by municipalities, is likely to create severe traffic risks quite quickly after SGD operations begin. Hence the limit of acceptable change will be reached very quickly, unless road maintenance programmes are launched early in the exploration phase.

8. Some municipalities will cope with the exploration phase fairly well; others will struggle to manage even this level of SGD operations. Once limited production is reached, many municipalities and public services will face difficulties in planning and administering services related to SGD, including infrastructure management, environmental health, social development services, and policing. At higher levels of SGD operations, even the stronger municipalities will soon reach the limits of their capability. The key risk is that municipalities may be overwhelmed by too many new demands.

9. Many municipal officials and Councillors are prone to corrupt and nepotistic practices, as regular newspaper reports have shown. Different municipalities vary in their abilities to manage potentially lucrative contracts, with different levels of transparency and oversight. Many councillors and officials are also hampered by their lack of experience in dealing with mining issues generally, or SGD in particular. There is a risk that such individuals may find themselves in compromising deals with SGD companies, either knowingly or inadvertently. This may further reduce the legitimacy of municipalities, and promote party-political tensions. Once again, the limit to acceptable change is likely to be reached rather soon. One or two contentious situations are likely to set in motion a great deal of popular suspicion and hostility, particularly since the SGD issue is already a highly contested one in the Karoo. Proactive steps would require clear and sustained company measures to implement international guidelines on community engagement.

11.7.3 Best practice guidelines and monitoring

Best practices can be drawn from South African sources, as well as international agencies. South African practices have not been developed in relation to SGD and focus instead on general mining operations.

For mines, the drafting of SLPs is required, by South African law. The SLPs have several limitations, compared to the other approaches:

- The Plans are not made available to the public, although annual reports are;
- public involvement is not required in compiling them;

- there are no specified timeframes for reviews and updates;
- there are no explicit requirements for co-ordination with other initiatives;
- there is no explicit requirement for partnerships; and
- impact monitoring is not required (Franks and Vanclay, 2013).

Despite their shortcomings, SLPs would be an important strategy to examine companies' intentions with regards to local employment and social development. These Plans can be supplemented by other mechanisms to identify possible impacts and interventions timeously. In addition to the South African version of SLPs, there are several other formats for Social Impact Management Plans (SIMPS) (Franks and Vanclay, 2013). These include the International Finance Corporation (IFC) Performance Standards; Anglo American's Socio-Economic Assessment Toolbox and associated corporate management systems; and the SIMPS which were developed as part of an Environmental Impact Statement in the State of Queensland, Australia. These would be worth investigating.

SIAs attempt to encourage the commitment of resources for engagement with communities and other external stakeholders, and for the development of processes for regularly reporting on social performance (Franks and Vanclay, 2013). This also offers a valuable institutional mechanism to pin down company intentions and contributions to local development. Various methodologies for SIAs have been proposed, including the addition of local social needs assessments (Vanclay et al., 2015; Esteves and Vanclay, 2009).

SIMPs are a management tool for addressing social impacts during the implementation of planned interventions (projects, plans, policies and programs). SIMPs have the potential to operationalise the findings of dedicated phases of predictive assessment, outline the priorities, resources, strategies, processes, activities, commitments and staffing employed to avoid and mitigate negative impacts, and enhance the positive impacts of development (Franks and Vanclay, 2013). They can also build multilateral partnerships.

Internationally, communities have increasingly come to demand a greater share of benefits from local mining projects, more involvement in decision-making, and assurances that mining will be conducted safely and responsibly (Prno, 2013). This has resulted in the concept of a *SLO*, whereby communities broadly provide their approval of a mining project. Where the SLO is strong, local groups can participate in various activities of the mine, including reviewing reports, approving plans, monitoring agreement implementation, and guide training and hiring practices (Prno, 2013).

The success of SLOs depends on a variety of contextual factors, such as trust in government, local leadership and local values (Prno, 2013). Relationship-building is critical: companies need to be part of the fabric of the community, the company must keep its promises, and dialogues must be effective. Local benefits are important, including business opportunities, employment, and training; however, unequal benefits may cause further rounds of conflict. However, there is always the potential of local schisms, where part of a community is in favour of a mine (and participate in its structures), and another part remains suspicious. SLOs require some kind of joint management and decision-making.

SLOs have their own challenges. They are informal and unstructured (Owen & Kemp, 2013). They are open to interpretation, i.e. companies may claim that a SLO exists, or disaffected community members may claim that it does not even exist, or is not legitimate. SLOs may exclude marginalised local voices, which may lead to conflict at a later stage.

Important guidelines for social engagement are provided by the European Commission's *Oil and Gas Sector Guide on Implementing the UN Guiding Principles on Business and Human Rights* (n.d.). This document advises companies regarding their interactions with employees and affected communities. Key themes are: that human rights need to be included in companies' behaviour from the start of their activities in an area (including the exploration phase); that they need to engage in stakeholder mapping; that companies need to invest in appropriate skills to undertake such engagement; that these skills may differ from their normal operational technical skills; and that "root cause analysis" needs to be undertaken during situations of conflict.

Another set of standards for shale gas companies (*Equitable Origin,* 2015) includes recommendations on community engagement, dealing with grievances, monitoring impacts on water quality, land management and waste management. Furthermore, the International Council on Minerals and Mining has provided guidelines on obtaining Free, Prior and Informed Consent (FPIC) from local communities living in a mining region (see International Council on Mining and Minerals (ICMM), n.d.).

In addition to these company-driven mechanisms, capacity needs to be built at municipal and community level. A key question is the financing of municipalities; in order to fund additional or expanded functions, municipalities will need a larger funding flow. This could be provided by means of national subsidies, possibly drawn from SGD-related taxation revenue. SGD companies may be willing to fund local municipal functions, which would be a welcome adjunct to existing municipal revenue; however, this may also open the way to undue influence for these companies.

Municipalities and communities are often overwhelmed by rapid new activities, and suffer from a lack of clear information. Creating a community "task force" is a useful approach. It can serve as a clearing-house of information on the SGD and socio-economic issues. It can also conduct a baseline study of a locality before SGD starts, so that changes and impacts can be noticed quickly. Such profiles can identify the capacity required for local government and private services (ranging from ambulances to accommodation). Municipal staff or volunteers can work for this task force. The involvement of several LMs can help to promote inter-jurisdictional communication. Information such as drilling rig numbers and locations, well locations, permits, production trends, and real estate trends should be monitored. Such a task force can also reach out to energy companies who may be able to mitigate problems in some areas (Jacquet, 2009). Task forces can also plan for new growth, identifying new opportunities and resources. Local monitoring groups can build significant social cohesion and local empowerment (Haggerty and McBride, 2014). However, these processes may take years of sustained effort to establish and consolidate.

Planning and inter-sectoral collaboration are increasingly considered important for deriving long-term benefits for local communities from resource industry activities (Ennis et al., 2014). One suggestion that appears to have some merit is the notion of implementing a 'development authority' for SGD regions. These co-ordinating statutory bodies would have responsibilities cutting across portfolios in order to ensure projects move quickly and in an integrated way. In remote resource towns, this approach has the potential to manage the entire development/expansion phase, cutting across portfolios such as planning, land administration, regional development, environment, and even some of the essential service providers (Chapman et al., 2014).

Collaborative governance is becoming a popular means for addressing cumulative impacts in the resources sector; however, these often take a long time (up to two years) to establish. For example, in 2011, the Onslow Community Reference Group (CRG) in the Pilbara region in Western Australia comprises municipal, community and company representatives with members co-opted from state government agencies and contractors (Haslam-McKenzie, 2013). Typical issues include "buying local" and deciding where to house temporary employees. The company pledged financial support for local infrastructure. The complexity of SGD operations typically involves mixtures of government regulation, industry self-regulation, and regulation by new institutions evolving from ad hoc multi-stakeholder collaborations (Boutilier and Black, 2013; Figure 11.6).

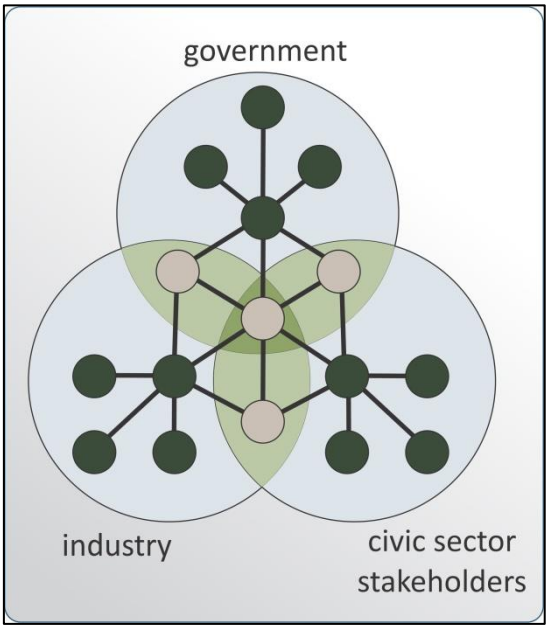

Figure 11.6: Interface between Government, Industry and Civil Society.
Source: Boutilier and Black 2013:697.

However, collaborative governance is not a panacea. A case study in Western Australia showed that, as the construction phase gathered pace, cracks emerged in process, as the community, local and state government and the corporate partners had different understandings of agreements. The state government was slow to honour its key leadership and partner role, and international market imperatives and government/corporate manoeuvring left the community with escalating housing costs, business closures and power and water shortages (Haslam-McKenzie, 2013).

The risk assessment table below (Table 11.4) provides an overview of the possible consequences, the likelihood of them taking place, and the risk to the social fabric which they pose. Clearly, in this topic, many of these assessments are normative, subjective and open to debate. For the purpose of the risk analysis:

- *Slight but noticeable consequences* refer to small and manageable impacts, or impacts on small sections of the community, or those which can be generally addressed by existing institutions, or can easily be balanced or outweighed by positive impacts.
- *Moderate consequences* refer to impacts which affect the bulk of the local population negatively, require some new institutional capacity, may well produce a net negative impact on the community, and would require some assistance by SGD companies and public authorities to manage.
- *Substantial consequences* refer to impacts which place significant strain on the bulk of the local population, require significant new institutional capacity to manage, and would require

extensive assistance by SGD companies and governmental authorities to manage. This would require, *inter alia*, a new approach to regional planning and support.

- *Severe consequences* refer to impacts which would cause significant social strain, would test institutional capacity to their limits, and would require a far-reaching SGD involvement to manage effectively. Regional planning and support systems would require extensive funding and skills to address possible impacts.
- *Extreme consequences* refer to impacts which could result in social or political violence or institutional collapse; mitigation would require a great deal of pre-emptive and far-reaching capacity-building as well as ongoing local partnerships between SGD companies, national government, municipal government, and local leaders.

The social fabric can benefit greatly from well-designed mitigation efforts. To achieve maximum impact, such efforts would have to be planned and co-ordinated by an inclusive regional strategic planning and management team. The classical "mitigation hierarchy" would be a useful guideline: What negative impacts can be avoided, and how? What impacts can be reduced, and how? Where are negative impacts unavoidable (e.g. in-migration). How can social problems be identified and pre-emptive measures taken? How can local people be compensated for unavoidable losses or harms? These solutions are not self-evident at this early stage; they would have to be negotiated by a well-designed and resourced management structure.

Table 11.4: Risk assessment matrix for social fabric.

Impact	Scenario	Location	*Without mitigation*			*With mitigation*		
			Consequence	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**
Human migration	Reference Case	All towns involving SGD	Moderate	Likely	Low	Moderate	Likely	None
	Exploration Only		Severe	Very likely	Moderate	Severe	Very likely	Low
	Small Gas		Severe	Very likely	High	severe	Very likely	High
	Big Gas		Severe	Very likely	Very high	Severe	Very likely	High
Physical security	Reference Case	All towns involving SGD	Moderate	Likely	Low	Slight	Likely	Very low
	Exploration Only		Severe	Very likely	High	Substantial	Likely	Moderate
	Small Gas		Extreme	Very likely	Very high	Substantial	Very likely	High
	Big Gas		Substantial	Very likely	High	Substantial	Likely	High
Altered local social dynamics	Reference Case	All towns involving SGD	Slight but noticeable	Very likely	Very low	Slight but noticeable	Likely	Very low
	Exploration Only		Substantial	Very likely	High	Moderate	Very likely	Moderate
	Small Gas		Severe	Very likely	High	Substantial	Very likely	Moderate
	Big Gas		Substantial	Very likely	High	Moderate	Very likely	Moderate
New power dynamics	Reference Case	All municipalities involved with SGD	Moderate	Very likely	Low	Slight	Very likely	Very low
	Exploration Only		Severe	Very likely	High	Substantial	Very likely	High
	Small Gas		Severe	Very likely	High	Substantial	Very likely	High
	Big Gas		Substantial	Very likely	High	Moderate	Very likely	Moderate

The analysis finds high levels of risk in all four causal pathways (migration, physical security, social relations and governance); however, mitigation measures can significant reduce the level of risk. The critical question will be the political will, on the part of Government and SGD companies, to abide by international guidelines on community engagement.

11.8 Gaps in knowledge

The analysis of the impacts of rapid large investments in South African towns would benefit by drawing on the experience of the renewable energy projects being rolled out in various towns in central South Africa. There is, as yet, no monitoring and evaluation study of these projects, and this is urgently required. The findings from such studies would be very valuable in anticipating some of the risks to the social fabric which we can expect from SGD projects in this area.

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11.10 Digital Addenda 11A – 11B

SEPARATE DIGITAL DOCUMENT

Digital Addendum 11A: Municipal information

Digital Addendum 11B: Provincial and municipal powers and functions