

RESEARCH

# Governance of Fracking in Africa

Caitlin Corrigan\* and Ilia Murtazashvili†

Concerns about the environmental and ecological consequences of hydraulic fracturing have accompanied the shale boom in developed countries at the forefront of shale exploration and production. These environmental and ecological consequences may be of even greater concern in developing countries with less governance capacity. We present a conceptual framework that specifies several variables that are expected to contribute to sustainable hydraulic fracturing. We use the framework to characterize prospects for sustainable hydraulic fracturing in South Africa and Botswana. The framework and evidence clarify the institutional capacity and institutional challenges confronting sub-Saharan African countries as extraction of natural resources using hydraulic fracturing begins in earnest.

**Keywords:** Governance; hydraulic fracturing; fracking; institutions; resource curse; South Africa; Botswana

## Introduction

A number of economic studies of the shale boom in the United States (US) find that shale resources are associated with economic growth (Hausman and Kellogg, 2015; Mason et al, 2015; Weber, 2012). However, there are also substantial environmental risks associated with hydraulic fracturing (fracking) (Small et al, 2014; Vidic et al, 2013), and federalism in the US has been criticized as contributing to an ineffective regulatory regime (Richardson et al, 2013; Warner and Shapiro, 2013).

Despite concerns, the US has an arguably high-quality regulatory framework. US states have the majority of authority to regulate extraction and have responded to the shale boom by adapting conventional oil and gas regulations to hydraulic fracturing. Additionally, several states have enacted de facto bans on fracking (Murtazashvili, 2015). While Congress has not expanded the jurisdiction of the US Environmental Protection Agency (EPA) over fracking, the EPA coordinates scientific studies of the consequences of shale production and could theoretically impose national fracking standards. Moreover, the polycentric system of governance in the US provides access points for local level citizen participation in decisions regarding the appropriateness of shale extraction (Arnold and Holahan, 2014).

US regulatory institutions governing extractive industries such as hydraulic fracturing also appear fairly competent in comparison to those of a typical developing

country. Resource abundance often undermines economic wellbeing in the developing world (Boschini et al, 2007; Sachs and Warner, 2001; Van der Ploeg, 2011). Challenges for developing countries include ineffective governance, resource and revenue mismanagement, ineffective regulations that undervalue and under-tax resources, exploitation by extraction companies, and lack of transparency (Besada et al, 2015). Fortunately, the so-called 'resource curse' is not inevitable (Humphreys et al, 2007; James, 2015). Rather, political features of the economy, in particular the quality of governance, determine the extent resource wealth is a blessing rather than a curse (Collier and Hoeffler, 2005; Poteete, 2009b; Robinson et al, 2006). Thus, one expects that the prospects for sustainable hydraulic fracturing, which in this paper refers to extraction that balances economic growth and job creation with minimized socially costly externalities, will depend on the context within which extraction occurs.

Our empirical studies consider the governance situation in Botswana and South Africa, two African countries for which widespread fracking is a very real possibility.<sup>1</sup> To guide our empirical study, we draw upon the 'institutionalist' literature on governance, in particular Elinor Ostrom's (1990, 2005) work on resource management. Institutional theories suggest a number of variables that should influence the prospects for sustainable fracking, including equity of distribution of the benefits and costs of resource use, information and monitoring capacity, accountability, polycentricity, democratic inclusiveness, dispute resolution mechanisms, and adaptability and flexibility.

The conceptual framework and empirical analysis in this work clarify the capacity and limitations of governance as exploration for fracking begins in earnest in Botswana and South Africa. Our research finds that both countries have regulation in place that allows the national government

\* Ph.D. Candidate, Graduate School of Public and International Affairs, University of Pittsburgh, United States  
ccc39@pitt.edu

† Assistant Professor, Graduate School of Public and International Affairs, University of Pittsburgh, United States  
imurtaz@pitt.edu

to extract rents from fracking activities. However, there are fewer institutional safeguards to ensure local government and communities benefit in the same way. Moreover, interview data from fieldwork reveals that regulatory agencies lack capacity to monitor operational compliance with regulation and provide very little information to local governments and communities, decreasing the ability for informed local level deliberation regarding shale extraction. Thus, we identify several areas where improvements on key governance dimensions may increase the chances of sustainable hydraulic fracturing.

In considering fracking, which is often a highly charged political issue, it is important to discuss our perspective. While we purport to offer an institutional analysis of the governance system, all analysis, including 'positive' analysis of economics, requires making value judgements (Bromley, 2006). To that end, our perspective is that conservation of shale resources is a more realistic proposal than preservation. As Collier (2010) suggests, it is often unrealistic to ask developing countries to keep their resource as if they were in a museum, which preservation tends to ask. In contrast, conservation recognizes that current generations have an interest in using resources to enhance development prospects, while also ensuring there is enough of the resource left to benefit future generations. To that end, our paper seeks to better understand under what conditions society can capture some of the scarcity rent associated with shale production, assuming some extraction will occur, while doing so responsibly.

This essay is organized as follows. Section 2 provides a conceptual framework to characterize governance of hydraulic fracturing. Section 3 and 4 consider the prospects for effective governance of fracking in South Africa and Botswana, respectively. Section 5 discusses the policy implications and concludes.

### **A conceptual framework to analyze governance of hydraulic fracturing**

Natural resources have features of a common pool in that they are non-excludable and divisible. With conventional oil and gas, the institutional solution to the problem of wasteful racing to establish ownership is establishing shared common pool property rights. Under such unitization agreements, all drillers with access to a reservoir agree to share in the production profits (Libecap and Smith, 1999; Libecap and Wiggins, 1985).

In contrast with conventional oil and gas, the fundamental challenge with hydraulic fracturing is dealing with environmental externalities rather than wastefulness in the race to establish property rights institutions (Holahan and Arnold, 2013). With unconventional natural gas, the shale is challenging to reach, which makes the race less of a problem. However, groundwater contamination from fracking is a threat that does not affect conventional oil and gas extraction. Thus, the challenges confronting hydraulic fracturing require different institutional solutions compared to conventional oil and gas. Additionally, the property rights perspective tends to understate the politics of resource governance (Poteete, 2003).

For these reasons, when considering fracking, a governance perspective is a more useful place to begin than the property rights approach. A key question is what constitutes 'governance.' A long tradition of literature conceptualizes governance mainly in terms of formal administrative capacity (Barnard, 1938; Fukuyama, 2013). Ostrom (2005, 2009) in contrast, proposes a more encompassing notion of governance that acknowledges the complexity and diversity of governance systems, as well as the interrelationship between de jure and de facto systems of governance.

Ostrom's work on resource governance, as well as the 'new institutionalism' in economics (Williamson, 2000), shares the common presumption that institutional features of political regimes determine key political, economic, and social outcomes. Since there is a vast literature on institutionalism, we discerned from the literature a number of key variables that are particularly important for understanding hydraulic fracturing. For example, the social-ecological systems (SES) approach, also pioneered by Ostrom, includes a large number of variables (dozens, in fact) (Cole et al, 2014; Ostrom, 2009). While complexity has its virtues, it can also make discerning policy implications quite challenging since there are so many moving parts in the analysis. The following list has the advantage of offering a much richer description of governance of natural resources than the property rights approach, while also offering a more parsimonious approach than the mature SES approach.

The first governance variable is equity of distribution of the benefits and costs of resource use. Ostrom (1990) argues that a system of governance that attempts to more equitably distribute the benefits and costs of natural resources use may be more likely to sustain the benefits streams associated with resource extraction. With extractive industries, a challenge in the developing world is that the state is often too weak to extract its fair share of the scarcity rent associated with natural resources (Bromley and Anderson, 2012). Consequently, a key question is whether the government has in place mechanisms to ensure that government distributes the benefits of fracking widely and that communities bear the costs of fracking as a shared responsibility. This variable is important because governments may not have the ability to implement a tax upon resource extraction and there may be few mechanisms to ensure a relatively equal distribution of the environmental costs of fracking.

A second governance variable is information and monitoring capacity, which includes capacity to gather information on the benefits and costs of resource use, to monitor resource use, and the presence of feedback mechanisms for decision-makers to learn about the consequences of policies and programs. Monitoring and evaluation provide insight into when it is desirable to change institutions and governance policies. The presence of such capacities are particularly important in developing countries and cannot be taken for granted (Andrews et al, 2013).

Success on the dimension of information and monitoring is a question of the extent to which government organizations or institutions are able to record information

regarding fracking, monitor compliance with resource use regulation, and disseminate findings to policymakers and stakeholders. Information and monitoring capacity may include the extent to which the state has ability to conduct baseline studies of groundwater and to disseminate information to concerned citizens.

A third variable is accountability, which refers to the extent that users of a resource bear some of the costs of governance and are accountable for their actions. Accountability depends on establishing clear boundaries of responsibility for policies and actions and the ability of the state to enforce the rule of law (Gauri and Lieberman, 2006; Lieberman, 2011). In considering governance of fracking, accountability asks whether gas companies bear the relevant social costs associated with extraction, and the extent to which the state is capable of enforcing its rules.

A fourth variable, polycentric governance, refers to overlapping systems of jurisdictions, each with shared political authority (Ostrom et al, 1961). Polycentric systems are associated with improvements in conservation of water and energy resources provided there are linkages across local jurisdictions (Blomquist and Schlager, 2005; Heikkila et al, 2011; Sovacool, 2011). This suggests that polycentric governance of fracking will improve governance outcomes, with the extent of improvement contingent on the degree to which there are mechanisms facilitating coordination across jurisdictions where fracking may occur.<sup>2</sup>

Polycentric systems of governance vary in the extent to which they facilitate democratic inclusiveness. The fifth variable, democratic inclusiveness, refers to the extent to which political institutions facilitate access to the political process. Increasing participation should improve the quality of institutions and prospects for economic development (North et al, 2009). Local level democracy can also ensure the rights of communities are respected vis-à-vis the central government (Myerson, 2014). Citizen participation through elections or referendums, and the extent to which the political regime is democratic and encourages or allows groups to participate in the political process,

are expected to improve the legitimacy of rules governing hydraulic fracturing, as well as increase the ability to implement these rules.

A sixth variable is dispute resolution. Disputes are bound to arise during the process of economic development. Mechanisms for reducing disputes are important because they reduce the return to violence for resolving conflicts (Blattman et al, 2014).

In the developing world, dispute resolution often occurs through both de jure (formal) and de facto (informal) legal institutions. Ostrom (1990, 2005) emphasizes that de facto legal institutions are often effective, particularly when the state provides such forums with autonomy. Similarly, the literature on legal pluralism suggests that there are merits to increasing adjudication options (Meinzen-Dick and Pradhan, 2002), since informal legal institutions are often an efficient solution to challenges confronting local actors seeking to resolve conflicts (Leeson and Coyne, 2012; Murtazashvili and Murtazashvili, 2015). Thus, in considering dispute resolution, we consider both de jure and de facto institutions, as well as how much autonomy the state provides to informal tribunals.

Finally, adaptability and flexibility are important features of governance. While adaptability of institutions is typically desirable, one expects that governance will be constrained by past choices and more prone to incremental problem solving or solving the 'wrong' problems (Pierson, 2000; Poteete, 2009b). The potential for path dependence suggests the importance of considering the extent to which the system of governance of hydraulic fracturing is able to respond to changing conditions.

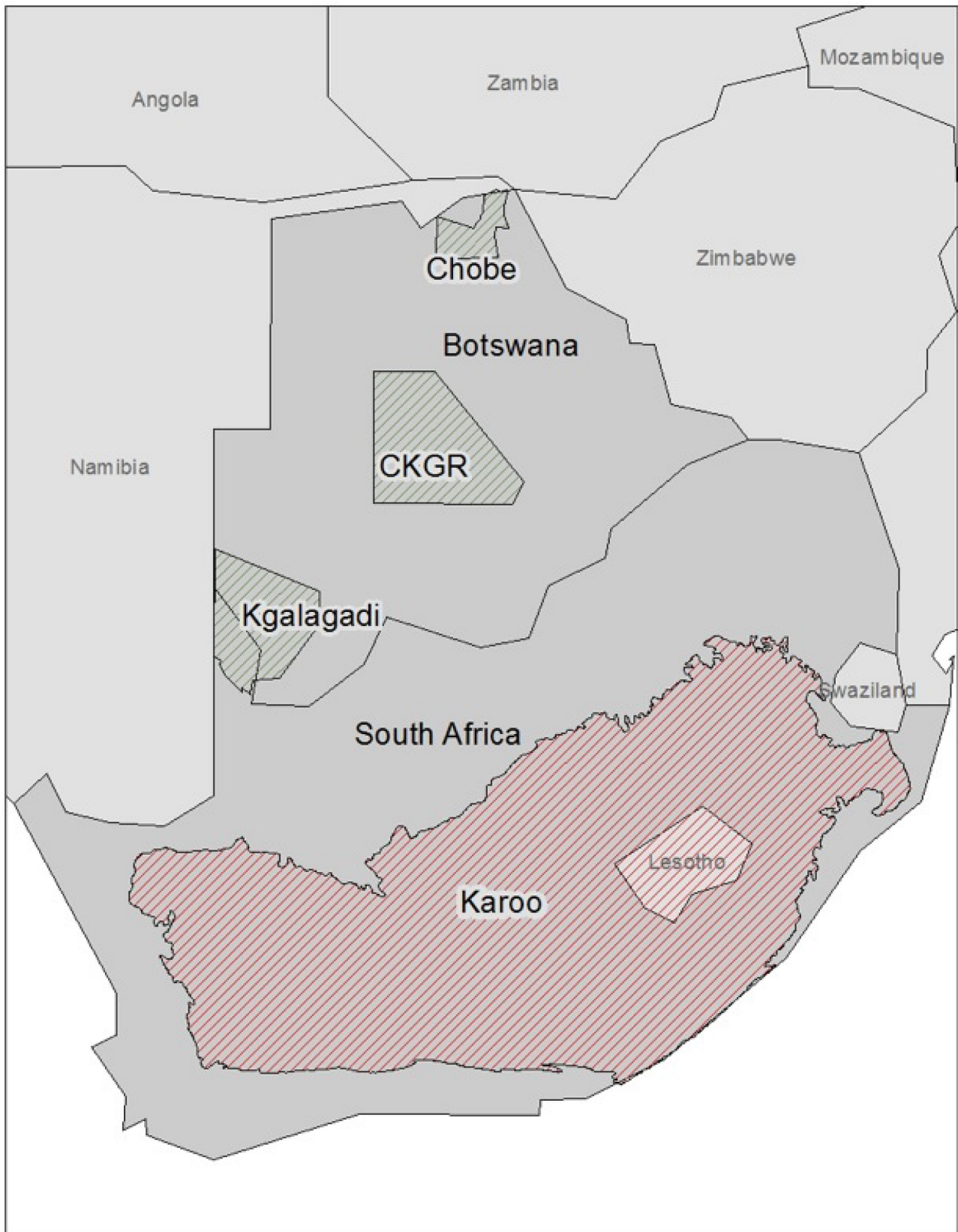
**Table 1** summarizes the conceptual framework.

### Governance of hydraulic fracturing in South Africa

The Karoo Basin in South Africa is estimated to hold up to 390 trillion cubic feet (tcf) of technically recoverable shale reserves, making it the eighth largest shale worldwide and the largest in sub-Saharan Africa (US Energy Information Administration, 2013) (see map – **Figure 1**). The energy

Governance Dimension	Indicators for Governance of Hydraulic Fracturing
Equity of distribution of benefits and costs	Extent to which the government is capable of redistributing the rents from hydraulic fracturing
Information and monitoring capacity	Capacity of the government to record activities of gas companies, to establish baseline environmental and health readings, citizen access to information from government, and ability to monitor the consequences of hydraulic fracturing
Accountability	Extent to which company officials responsible for hydraulic fracturing can be held accountable
Polycentric governance	Extent to which governance of hydraulic fracturing is shared with multiple jurisdictions, both vertically and horizontally
Democratic inclusiveness	Extent to which political processes involving hydraulic fracturing are democratic and inclusive
Dispute resolution	Extent to which the legal framework is capable of resolving conflicts that arise over hydraulic fracturing, including conflicts over land and land use and the environmental consequences of hydraulic fracturing
Adaptability and flexibility	Extent to which the regime governing hydraulic fracturing can respond to new circumstances

**Table 1:** Governance variables and hydraulic fracturing.



**Figure 1:** Potential hydraulic fracturing areas in Southern Africa.

implications for the region are potentially profound since South Africa currently imports around two thirds of its natural gas and only three percent of energy consumption comes from natural gas (African Development Bank Group, 2013; US Energy Information Administration, 2014).

South Africa relies on coal for 70 per cent of primary energy consumption and 93 per cent of electricity generation. Although overall access to electrification is 75 per cent, this rate is much lower in rural areas and rolling blackouts are commonly implemented to alleviate

excess demand. Additionally, estimates indicate that shale extraction will create an estimated 350,000 to 850,000 direct and indirect jobs (African Development Bank Group, 2013; Eberhard, 2013). Shale extraction also promises government revenue, as the Minerals and Petroleum Resources Development Act (MPRDA) (2002) establishes state ownership of sub-surface minerals.<sup>3</sup>

Despite the potential promise of fracking, there are a multitude of risks associated with shale extraction, particularly at the local level. The large amounts of water required for fracking operations will likely present challenges as the Karoo Basin is an extremely water stressed region (Reig et al, 2014). Furthermore, geological characteristics of South African shale formations indicate that hydraulic fracturing has an increased risk of groundwater contamination that suggests the need for stricter regulations than in other regions (Van Tonder et al, 2013). These risks suggest that the realization of social benefits and minimization of social costs from fracking will depend on the governance situation in South Africa, considered below.

### **Equity Distribution**

The fundamental mechanism governing equity distribution is the MPRDA (Mineral and Petroleum Resources Development Act, 2002), which has three key mechanisms in place to improve prospects for an equitable distribution of the benefits of hydraulic fracturing.<sup>4</sup> First, it establishes the right of the government to levy fees and taxes on operations. Companies are required to submit their financial information to the national government for this purpose. This provides a framework for distributing the rents associated with fracking, although who receives the largest share is likely to reflect political considerations. Second, all operations must conduct an environmental impact assessment (EIA), create an environmental management plan, and submit a Social and Labor Plan (SLP) in order to obtain a license. SLPs are binding documents that stipulate how an operation will invest in the community and workforce surrounding their operations (Republic of South Africa, 2010b). Their purpose is to ensure local communities benefit from fracking and to provide them with opportunities to challenge perceived inequalities in distribution of the costs of resource extraction. Third, the broad based socio-economic empowerment charter, required by the MPRDA, stipulates that 26 per cent of operations be owned by historically disadvantaged South Africans (Republic of South Africa, 2010a). These institutions are meant to spread the wealth generated from the extractive industries domestically.<sup>5</sup>

Despite several institutional mechanisms to improve equity of distribution of benefits and costs of fracking in South Africa, there are no mechanisms for intergovernmental transfers to different localities based on where extraction occurs. Additionally, local governments do not collect much revenue compared to total government revenue. In 2009/2010, local government collections made up only 7.5 per cent of government revenues (Republic of South Africa, 2008, 2011). The low overall proportion of revenue collected by local governments suggests they

may not benefit as much as the national government from shale production even though environmental costs are likely to accrue locally. As the following informant suggests, local governments also face challenges in retaining administrative talent:

*If you remotely perform at the municipal level you get pulled up to the provincial or state level. So there is just a dearth of skills of the municipal level. Not because we don't have good policies in South Africa. It is on the implementation level that we fall down.<sup>6</sup>*

The institutional environment would thus suggest that local governments would receive less than their fair share of benefits from higher levels of government, while bearing a disproportionate amount of the costs of fracking. In addition, administrative capacity at the local level may be lacking, thereby undermining the quality of local governance.

### **Information and monitoring**

South Africa has fairly extensive mechanisms for the national government to monitor and collect information regarding resource extraction. According to the MPRDA, the majority of the authority and responsibility for monitoring production, revenues, and compliance rests with the national government and the Department of Mineral Resources (DMR). The national DMR office approves licenses and the regional DMR offices monitor compliance with SLPs. The MPRDA stipulates that all financial information be provided to the national government.

Despite a basic framework to collect information at the national level, local governments and citizens lack an effective mechanism for gathering accurate information about the potential impacts of a project. While citizens could gather information through the Public Access to Information Act, the process is arduous and places the burden of information collection on citizens. Local governments and community members may therefore know very little about the profitability of an operation or the SLP promises.

### **Accountability**

The government has the ability, through the DMR, to hold companies accountable to MPRDA standards. The companies see environmental or worker-safety non-compliance with regulation as a major threat to operations as this can result in a shutdown. However, companies do not see SLP non-compliance as a threat.<sup>7</sup> During fieldwork, informants were asked about issues related to compliance with social investments (SLPs). The following remark, from a legal/corporate social responsibility (CSR) expert, was representative of the comments on such issues:

*The fact of the matter is that these social and labor plans [or] mining rights are given on the basis of [social investment] promises . . . [But] I have never heard of one mining right being pulled because of not fulfilling a social and labor plan commitment.<sup>8</sup>*

Capacity constraints in monitoring compliance are especially troubling at regional DMR offices. According to a government official interviewed, companies are well aware of the DMR's constraints:

*With the limited capacity that we [the DMR] have . . . we are lucky in a region where we have two social plan people who can do actually the [compliance] assessment . . . So, companies are aware that we don't have the capacity, we are thin on the ground. So, some of them get away with [non-compliance], because they know . . . even if you [the DMR] find non-compliance, chances of you coming back are very slim.<sup>9</sup>*

### **Polycentric governance**

South Africa is a federal state that also includes political representation of traditional authority.<sup>10</sup> However, local governments and traditional authorities have far less capacity than higher levels of government. The majority of agencies operate at the national level. The Ministry of Finance gathers information for royalties and taxes. The DMR has a national office with duties such as licensing, policy-making, and gathering of production statistics, while DMR regional offices have monitoring duties.

Informants suggested that substantial coordination problems between levels of government or different actors also exist. For example, confusion over the respective duties of the provincial DMR and local governments can result in redundant activities or certain duties not being filled. This confusion also exists between mining companies and local governments.<sup>11</sup> As one interviewee remarked: 'there is not a very clear line between what government's responsibilities are, in terms of service provision, and what the mines' responsibilities are.'<sup>12</sup>

An important example of a coordination problem concerns the Kgalagadi Transfrontier Park, which stretches across the borders of South Africa and Botswana. The park is jointly managed by the two governments and the wildlife populations migrate openly between the countries (Republic of South Africa, 2015). Reports indicate that Botswana has already issued exploration licenses on their side of the park (News24, 2015: 24). Since South Africa has not granted any exploration licenses for fracking, and environmental externalities generated by exploration in Botswana have potential to affect the wildlife in South Africa, polycentricity may undermine prospects for sustainable fracking in this case.

### **Democratic inclusiveness**

Although South Africa has made strides in improving democratic inclusiveness in the past decades, there are several challenges to deepening democracy as it pertains to natural resource extraction. First, while SLPs are supposed to provide communities opportunities to participate in collective resource governance, community consultation or opinion gathering in terms of issuing exploration and production licenses under the MPRDA or technical co-operation permits (which allow companies to do feasibility studies) can be inadequate (Fig, 2012).

Second, even though local governments and companies may consult communities at the beginning of a project, there is often little engagement after operations begin. As a NGO official explained:

*I have pictures that I took last week in Limpopo, where they consulted with the community in 2004. Lots of meetings, making all kinds of promises. So I go there and I take pictures of the noticeboards of the community meeting place . . . all the notices are dated 2004, so that's the last time they did anything with the community. So I went and I asked the community, when did you last see these people? In 2004. That's when they needed a mining license. Once they got their mining license the CSR is gone, out the window.<sup>13</sup>*

Third, it is up to a company to determine who is in their 'community.' Although MPRDA and SLP guidelines stipulate that companies consult all local governments and communities about operations, community consultation standards are often poorly understood, as evidenced by several high-profile legal cases seeking to clarify what constitutes proper community consultation with respect to mining licenses. In a landmark case, Genorah Resources was granted a prospecting license under the MPRDA on Bengwenyama traditional community land. However, the community never signed the consent form, was never formally consulted, and even applied for its own prospecting license (which was refused). The case was appealed several times and finally the Constitution Court of South Africa ruled in favor of the community (Christiansen, 2013). While this decision was a win for communities, legal conflicts such as this reflect an underlying lack of clarity regarding standards for community consultation.

Finally, local governments are often dependent upon mining companies for information. This information imbalance reduces community bargaining power vis-à-vis mining companies,<sup>14</sup> as one informant explained:

*So you are talking about a power imbalance, a massive power imbalance where most mine affected communities are in a rural set up . . . You have mining companies coming in with a lot of money and a lot of knowledge and talking very technical stuff, throwing a lot of information at communities, that they can't digest, and the time frames in which consultations take place just do not amount to a sufficient interrogation of the facts. And meaningful consultation means taking the facts into consideration in making up your own mind about it. There is no way that meaningful participation happens . . . it just does not happen.<sup>15</sup>*

On the other hand, civil society groups play a noticeable role in this particular debate. The Treasure the Karoo Action Group (TKAG) has led the charge against hydraulic fracturing in South Africa and created their own community voice (TKAG, 2015). They argue that under current regulations and current scientific

knowledge about the impacts of fracking, 'sustainable' extraction cannot happen. The group's success in pressuring the government to put in place a moratorium on fracking in 2011 indicates that some groups have a powerful voice in the policy process, although it is important to recognize that a moratorium merely postpones key policy decisions. Furthermore, the group with the loudest voice may not represent the majority of the community. TKAG, for instance, consists predominantly of wealthier, white, land-owning farmers in the region (Cropley, 2013, Pitock, 2011).

### **Dispute resolution**

As **Table 2** shows, South Africa is relatively strong in terms of the rule of law compared to the rest of the region, which generally bodes well regarding institutions for resolution of disputes.

While broad governance indicators can be useful, understanding prospects for sustainable shale governance requires a more nuanced perspective. Several institutional procedures provide citizens with opportunities to resolve conflicts through the legal process. The MPRDA spells out the process of dispute resolution for 'any person whose rights or legitimate expectations have been materially and adversely affected' (Republic of South Africa, 2002: 42). Individuals can appeal to the director general or minister of the designated agencies when disputes occur. If these options are exhausted, the South African courts can assert judicial review over issues. Unfortunately, the system appears to be quite backlogged. As of August 2012, there were approximately 2,000 unresolved internal disputes under the MPRDA (Mavuso, 2013).

Many disputes have also gone beyond the DMR and have appealed to the High Courts, Supreme Court, or Constitutional Court to rule over disputes regarding the extractive industries. Most disputes occur around mining activities, and of these, many involve environmental issues. For example, in April 2015, a coalition of eight civil society and community organizations legally challenged a DMR decision to grant a mining right to a mining company inside the Mabola Protected Environment (Center for Environmental Rights, 2015b). At least sixteen finalized cases have been brought before higher courts since

the MPRDA came into force and there are at least sixteen cases still pending judgment (Center for Environmental Rights, 2015a).

The presence of institutions providing citizens with legal recourse, and the willingness of courts to exercise judicial review over issues involving extraction of natural resources, is cause for optimism regarding fracking. However, it is axiomatic in legal studies that those with resources have advantages in adversarial legal processes.<sup>16</sup> For this reason, one expects gas companies to have structural advantages in dispute resolution processes. In addition, the large number of pending disputes suggests the process may be inefficient.

### **Adaptability and flexibility**

The process of changing regulations governing resource extraction has been fairly slow moving. It took almost a decade for the new democratic government to formally establish the new mining and petroleum laws. However, the process of adapting to shale extraction appears a bit more fluid than in the case of conventional energies.

The creation of The Petroleum Agency of South Africa (PASA), the recent addition of the Gas Utilization Management Plan (GUMP), and the draft proposal on technical regulations on petroleum exploration and development demonstrate the government's commitment to specifically regulating the gas industry in the future. Additionally, the government's decision to place a moratorium on shale gas exploration from 2011 to 2012 and to only issue technical cooperation rather than exploration permits suggests at least some caution in the process of regulating fracking (Reig et al, 2014). An inter-departmental task team was also created to establish new guidelines on drilling in the Karoo and, more broadly, in South Africa (South African Government News Agency, 2013). Because fracking involves heavy water usage and a major concern is water contamination, in addition to dealing with the DMR, the new guidelines on petroleum exploration and production (yet to be formally approved) call for the involvement of the Department of Water Affairs (DMR, 2013). Each of these developments suggests at least a modicum of adaptation and flexibility in response to new challenges associated with fracking.

<b>Average 2002–2012</b>	<b>United States</b>	<b>South Africa</b>	<b>Botswana</b>	<b>Sub-Saharan Africa</b>
Control of Corruption	1.49	0.25	0.96	-0.64
Government Effectiveness	1.60	0.52	0.56	-0.79
Political Stability/No Violence	0.32	-0.07	0.98	-0.56
Regulatory Quality	1.51	0.55	0.59	-0.74
Rule of Law	1.56	0.09	0.63	-0.75
Voice and Accountability	1.18	0.61	0.51	-0.63
State Fragility	2	5	3	15
GDP Per Capita	45786	5513	5562	1850

**Table 2:** Economic and governance statistics. Source: World Bank (2013). The governance indicators (except state fragility) range from -2.5 to 2.5, with 2.5 being highest-quality governance. For state fragility, higher scores indicate higher levels of fragility.

### Governance of hydraulic fracturing in Botswana

Botswana is now in the early stages of granting exploration licenses for coal-bed methane (CBM). As CBM is also extracted using hydraulic fracturing, the environmental challenges confronting Botswana are similar to the issues associated with shale gas. While estimates of the extent of these reserves are unclear in Botswana, their exploitation would likely take place within valuable wildlife areas in the country, the Central Kalahari Game Reserve (CKGR), Chobe National Park, and the Kgalagadi Transfrontier Park (shared with South Africa) (Lee, 2014) (see map – **Figure 1**). For these reasons, it is useful to consider prospectively the governance situation in the country.

#### Equity distribution

The Botswana Government's policy is that natural resources, including mineral resources, benefit all (Collier, 2013). There are several mechanisms in place to implement this principle. Because unconventional gas in Botswana is extracted from CBM, it is covered by mineral mining rather than petroleum laws. Similar to South Africa, the Mines and Minerals Act of 1967 vests mining rights with the state. Under the 1999 Mines and Mineral Act, the government has the right to acquire a 15 per cent working interest in any licensed mining operation. Licenses are only granted to non-citizens of Botswana as an exception. Additionally, operations are required to pay a 3 per cent royalty of gross market value on mineral products to the government as an annual charge. Moreover, local governments also have the authority to levy taxes (Government of Botswana, 1965), although the ability to collect taxes depends upon the capacity of local government.

The Botswana government requires EIAs, administered through the Department of Environmental Affairs. However, in contrast to South Africa, there are no specific requirements for social impact assessments or something similar to SLPs. As one interviewee explained:

*[CSR for companies in Botswana] is probably thirty years behind how big companies work in South Africa. It is very random. What you would get there [Botswana] is what I always call chairman's follies. Where you have the wife of the chairman or an executive's favorite pet project . . . there are no safeguards against it. Zero.*<sup>17</sup>

While most major companies in Botswana have some sort of CSR program, there are few discernible political safeguards surrounding these investments.

#### Information and monitoring

In terms of reporting and monitoring, Botswana ranks quite low among resource rich states. The Resource Governance Index ranks Botswana as the ninth worst country (out of fifty eight) for reporting practices. This is by far Botswana's worst resource governance score (Natural Resource Governance Institute, 2013).

The government gathers information regarding resource production and is thus able to tax at a national

level; however, it only reports these amounts in aggregate to the public. EIAs are not publically published and there is no regulation for freedom of information. Additionally, it is reportedly difficult to find experts on hydraulic fracturing in the region, and NGOs and communities have little knowledge about the consequences of shale exploitation.<sup>18</sup>

#### Accountability

As the government can invest up to 15 per cent in any operation, it can use this leverage to hold companies accountable. The reporting requirements at the national level allow for the national government to hold companies accountable for revenue generation. However, lack of information poses problems for both local government and citizens to hold industry accountable.

There also appears to be some confusion regarding the responsibility of mining companies. As one of the informants explained:

*The people in those villages (near the mines) are not aggressive. They are not politically inclined. They go on with their normal lives. So sometimes you cannot really know if there is an issue . . . or they [the villages] are not sure that you're supposed to do something for them. So even (if) you ask them, what do you think of the mine, they will say, no, it is not the mine's responsibility.*<sup>19</sup>

One possibility is that citizens do not want to hold the mining companies accountable. However, it may be the case that villagers do not hold them accountable because they lack information, which makes them less politically 'aggressive.'

#### Polycentric governance

Botswana's mineral regime is fairly centralized, as rights to exploration of deposits rest with the national government in Botswana (Government of Botswana, 1999). The Department of Mines is charged with issuing licenses and permits for mining activities and producing information about revenue generation. The Botswana Unified Revenue Service and the Bank of Botswana gather information on revenue generation. The Department of Environmental Affairs is responsible for administering and controlling EIA activities. Because CBM extraction would occur inside a national park, the Ministry of Environment, Wildlife and Tourism would be involved more broadly as well (Natural Resource Governance Institute, 2013; Walmsley and Tshipala, 2007).

Despite a high degree of centralization, there are a variety of lower levels of government in Botswana. Rural areas have district councils, and each area is represented at central government by a district commissioner. Local areas also have Land Boards, which hold the tribal land in trust. They are half appointed by traditional village assemblies, known as *Kgotla*, and half by the Minister of Land. Finally, traditional local chiefs still play a role in governance in two ways, they are chairmen of the *Kgotla*, connecting the



community to the government, and they preside over traditional courts (Sharma, 2009).

While decentralization has many benefits for natural resource governance, it is often derailed by ideological and jurisdictional conflict (Agrawal and Ostrom, 2001). In Botswana, political conflict has often undermined meaningful decentralization (Poteete and Ribot, 2011). Indeed, in the natural resource sector, political conflict has led to recentralization of natural resource governance in Botswana (Poteete, 2009a). To the extent that the experience with other natural resources is a guide, the commencement of fracking may increase political pressure to limit the role of local government in the regulation and taxation of extraction. Moreover, local governments in the country are comparatively under capacity as their entire development expenditure, and 80–97 per cent of recurrent expenditures, are met by central government.

### **Democratic inclusiveness**

Botswana has long been considered an economic success story in Africa because of its strong political institutions, in particular the integration of customary governance into the political regime (Picard, 1979). The Tswana tribes that make up the majority of the population in Botswana are known for their mechanisms of local democratic participation (Acemoglu et al, 2003). This system allows for normal citizens to express their concerns in the *Kgolta* and to trust that these concerns are relayed to the proper authorities.<sup>20</sup>

Despite mechanisms for local participation, one of the major complaints by foreign media has been that the government has distributed licenses for CBM exploration with little transparency and in environmentally and culturally important areas such as Chobe National Park (home to the largest elephant herds on earth) and the CKGR. For example, the government only revealed that several CMB licenses were granted after media accusations (Ramsay, 2013). Furthermore, there have been accusations that these licenses infringe on the rights of the traditional populations of the Basarwa (or San) in the CKGR with whom the government has been in a long legal battle concerning access to land. Botswana's inclusive local democratic institutions will not be effective or enhance sustainability if transparency remains an issue in CBM extraction.

### **Dispute resolution**

Botswana fares relatively well in terms of rule of law (see **Table 2**). The success of the Basarwa (or San) in taking the government to court over their illegal removal from the CKGR suggests that, in at least some important instances, the public is able to hold the government and mining companies accountable in the courts.<sup>21</sup> As these cases involved allegations that the government was making room for diamond mining and tourism by removing the San from their lands, but that the community successfully resisted these developments, it is implied that communities do have opportunities to use legal channels for dispute resolution in terms of CBM extraction. In addition, while the Mineral and Mines Act does not specify the process for

dispute resolution, it does mention that anyone who feels dissatisfied with agreements made under the Act is entitled to arbitration under the Arbitration Act (Government of Botswana, 1999).

Another aspect that potentially bodes well for Botswana is integration of de facto mechanisms of legal decision-making into the formal legal regime. Traditional courts, which handle about 80 per cent of criminal and 90 per cent of civil cases in the country, are an added layer of legal protection (Sharma, 2009). Although the dual court system at the local level raises potential for organizational complications or conflict – the traditional court is often preferred by citizens because it is cheaper and more approachable – additional options for legal resolution can improve prospects for dispute resolution. The caveat to this is that the extent to which de facto tribunals can operate effectively depends on the amount of autonomy extended to them by the state.

### **Adaptability and flexibility**

A strong tradition of democracy with free and fair elections, both at the local and national level, combined with mechanisms for local democratic participation, indicates that the government will be able to adapt to changing perceptions and preferences as they arise. This will occur either through normal democratic channels, in particular elections and citizens expressing their preferences to district councils and commissioners, or through court action, as evidenced by the Basarwa in the CKGR.

On the other hand, improving regulation requires information. The secrecy of the exploration process up to this point has left many citizens unaware of both the positive and negative effects of CBM extraction. The government has been slow to react to a call for a freedom of information act that would increase the amount of information NGOs and communities have on extractive industries in the country.<sup>22</sup> There has been little indication that new legislation is being discussed for unconventional gas exploration. The lack of debate could be a result of little outcry from normal citizens, which may in turn reflect a lack of understanding among citizens of the nuances of CBM extraction.

### **Conclusion**

From a governance perspective, several factors appear particularly important to improving prospects for sustainable hydraulic fracturing. First, additional safeguards are necessary to increase the chances that local governments profit from shale production. In both South Africa and Botswana, local governments are likely to bear the costs of hydraulic fracturing, yet it is far from clear that they will receive their fair share of the benefits.

Second, there are opportunities to improve the flow of information to communities and local governments, as well as improve mechanisms for real consultation. Transparency should go beyond disclosure to include efforts to ensure the message and information is received and utilized and can be used to enhance democratic participation (Fung, 2013). While both countries have

national level mechanisms in place to gather information, each government also has opportunities to package information in a way that is easier for local stakeholders to digest.

Third, it is critical to address the coordination problems that arise in polycentric systems of governance. Polycentricity can be a strength provided there is good coordination among local governments and between local and national governments. Yet in both countries in this study, it is far from clear whether the coordination mechanisms that are in place are adequate.

Institutional perspectives on governance, which we have applied to the cases of South Africa and Botswana, are potentially useful in comparing countries at different levels of development, or even within a country. For example, Goldberg et al have applied this approach to conclude that there is substantial variation in the quality of governance among US states, as well as variation in the extent to which states experience a resource curse with conventional extractive industries (Goldberg et al, 2008). Recent work has begun to explore the extent to which fracking is associated with a resource curse (Weber, 2014). In both developed and developing country contexts, institutional perspectives on resource governance promise to increase our understanding on the sustainability of hydraulic fracturing.

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### Competing Interests

The authors declare that they have no competing interests.

### Notes

<sup>1</sup> The empirical evidence consists of government documents, secondary sources, and fieldwork conducted in July and August of 2014 in Botswana and South Africa. Confidential in-depth semi-structured interviews (lasting anywhere between twenty minutes and three hours) were conducted with forty-four individuals, thirty-four in South Africa, nine in Botswana, and one phone interview. Observational notes were also taken during four tours of mining community and various corporate social responsibility (CSR) projects in Johannesburg, Kimberley, and Musina, South Africa and Jwaneng, Botswana. The main groups that were approached for interviews were government officials from the department of mines or local governments, staff at NGOs, public and corporate affairs staff at mining companies (who are the main actors that engage

with communities), union spokespeople, academics, regional and legal experts, and what is termed 'CSR experts' (who were normally either consultants for governments or companies on CSR issues or worked for institutes that did research on CSR). The interview questions mainly concerned the pressures and processes for CSR in mining communities. Thus, the conversations spoke to the general extractive industries' regulatory context in Botswana and South Africa, community consultation requirements for licensing, and the role of local government actors near operations.

<sup>2</sup> In some situations, in particular eradication of diseases, polycentric governance can serve as a constraint, mainly because it undermines opportunities for coordinated enforcement of constraints on human interactions (Lieberman, 2009). However, the literature on resource governance tends to view polycentricity as a source of good governance.

<sup>3</sup> Republic of South Africa, Mineral and Petroleum Resources Development Act (2002).

<sup>4</sup> The MPRDA has been criticized because it was not created specifically with shale gas extraction in mind (Vermeulen, 2014).

<sup>5</sup> While the intension of this act was to alleviate poverty, it has been criticized for empowering those in important political positions at the expense of the majority of disadvantaged people (Fig, 2007).

<sup>6</sup> Interview, July 2014, regional expert, South Africa.

<sup>7</sup> Interviews, July 2014, industry spokesmen, South Africa; July 2014, legal/CSR expert, South Africa; July 2014, government official, South Africa; July 2014, researcher, South Africa.

<sup>8</sup> Interview, July 2014, legal/CSR expert, South Africa.

<sup>9</sup> Interview, July 2014, government official, South Africa.

<sup>10</sup> Constitution of the Republic of South Africa, Chapter 12.

<sup>11</sup> Interview, July 2014, CSR expert, South Africa; July 2014, CSR expert, South Africa.

<sup>12</sup> Interview, July 2014, CSR expert, South Africa.

<sup>13</sup> Interview, July 2014, NGO official, South Africa.

<sup>14</sup> Interview, July 2014, legal/CSR expert, South Africa.

<sup>15</sup> Interview, July 2014, legal/CSR expert, South Africa.

<sup>16</sup> Indeed, even in a highly institutionalized legal system, the 'haves' tend to come out ahead (Galanter, 1974).

<sup>17</sup> Interview, July 2014, CSR expert, South Africa.

<sup>18</sup> Interview, July 2014, NGO official, Botswana.

<sup>19</sup> Interview, July 2014, Debswana Representative, Botswana.

<sup>20</sup> Interview, August 2014, academic, Botswana; August 2014, NGO official, Botswana.

<sup>21</sup> Basarwa (or San) took the government to court in 2002 over a dispute involving removal from their traditional area inside the CKGR, which they won in 2006. In 2010 they took the government to court again because they were denied access to water inside the CKGR; the courts ruled in their favor again in 2011 (Survival International, 2014).

<sup>22</sup> Interview, July 2014, Botswana expert, Botswana; Interview, July 2014, NGO official, South Africa.

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