

Article

Chiefs in a Democracy: A Case Study of the ‘New’ Systems of Regulating Firewood Harvesting in Post-Apartheid South Africa

Sarah J. Findlay * and Wayne C. Twine 

School of Animal, Plant and Environmental Sciences, University of the Witwatersrand, Private Bag 3 Wuts, Johannesburg 2050, South Africa; wayne.twine@wits.ac.za

* Correspondence findlaysj@gmail.com; Tel.: +27-83-969-2084

Received: 5 January 2018; Accepted: 7 March 2018; Published: 12 March 2018

Abstract: Much of the international commons literature reveals a decreased functioning of local traditional institutions that regulate natural resource harvesting. In South Africa, it is believed that the creation of new democratic structures at the end of Apartheid has contributed significantly to the deterioration in traditional resource regulation and this in turn has led to the extensive resource degradation seen in parts of the country. Many of these assertions, though, remain anecdotal in nature. Given the high reliance by rural households on natural resources, and the serious negative implications that over-use has on livelihood security, understanding how well or poorly such commons are regulated is key to ensuring the sustainability of such resource-dependent populations. The aim of this study was therefore to examine systems of resource governance, focusing specifically on firewood, and to determine the roles of traditional and democratically elected community leaders in six rural villages spanning two chieftaincies in Bushbuckridge, South Africa. In each study village, five local leaders were interviewed and five community focus groups were conducted. Results indicate that most parties still regard the Chief as the ultimate authority for regulating firewood harvesting. However, overall firewood management appears weak, at best, across the region. Although some authors attribute this to community confusion over the roles of local leaders in a new democracy, we provide evidence that other socio-political factors, including political expediency, may be driving the increasingly relaxed implementation of these firewood management systems. With resource dependence remaining a vital contributor to livelihood security across the developing world and with many rural communities facing increasing strain under local resource depletion, these findings shed new light on the complex social dynamics underlying the widely reported weakening of traditional institutions in South Africa. In so doing, it offers insights into local firewood governance that can be used to combat these challenges and thereby reduce regional social and ecological vulnerability being experienced in communal landscapes across the region.

Keywords: institution; natural resources; firewood; South Africa; traditional authorities; governance systems

1. Introduction

Hardin’s provocative ‘Tragedy of the Commons’ publication (1968) initiated the contemporary debate on common property resource management across the globe. He asserted that all resources that fell under communal property rights would invariably become overused (Hardin, 1968 [1]). While ‘tragedies’ of this nature have indeed occurred worldwide, an equally extensive body of research resists these purely pessimistic outlooks and reveals that resource degradation is not an inevitable outcome of communal resource harvesting (Ostrom et al., 1999, Poteete and Ostrom 2004, Hartter and Ryan 2010 [2–4]). Examples from across the globe demonstrate that common property systems are

not necessarily synonymous with circumstances of ‘open access’ (see Ostrom et al., 1999 [2]) and that successful collective action and effective resource management can indeed be achieved in multiple contexts. With millions of households directly and indirectly dependent on natural resources for everyday needs, there is a critical need to explore strategies that not only have the potential to enhance the livelihoods of those that extract them, but also that improve the landscapes from which they are extracted.

Within this scholarship, institutions have been repeatedly identified as a key factor in the success or failure of natural resource management (Ostrom 1990, Wells 1998, Acheson 2006 [5–7]). Institutions are described as the formal and informal structures or principles that guide human–environment relations and that shape perceptions, activities and behaviors associated with resource harvesting (Goetz 1995, Folke et al., 1996 [8,9]). Formal institutions, for example, can be used to manage community’s access to resources either by specifying how the land can be used (Belcher et al., 2005 [10]) or by enforcing resource-focused laws (Barrett et al., 2005, Cocks et al., 2008 [11,12]). These regulations influence harvesting decisions by incentivizing (or disincentivizing) certain behaviors, often through the prospect of punishment for disobedience. In this way, institutions regulate the ways in which resource users interact with their resources and they should therefore be central to the enquiry into individual and regional natural resource consumption (Seidman 1992 [13]). Following this, governance can be described as the relationships between processes and structures that define power dynamics in a specific context and the mechanisms by which decision-making takes place (Graham et al., 2003 [14]). Therefore, and for the purposes of this paper, institutions refer specifically to the institutional actors, including individuals and entities as the key players, as well as the rules, laws and governance arrangements they implement (Wells 1998 [6]).

Importantly, institutions are not static inert features of a system (Kepe and Scoones 1999, Adger 2000 [15,16]). Rather, institutions evolve, adapt and respond to context-specific internal and external drivers of change (Ostrom et al., 1999, Kepe and Scoones 1999, Potts et al., 2016 [2,15,17]). Here, changes to the broader social, cultural, economic and political landscape can impact on the effectiveness of institutions to moderate use (see Nkhata et al., 2017, Le Tourneau and Beaufort, 2017 [18,19]). Indeed, failure of societies to innovate new forms of governance in response to new stresses may mean that previously effective systems of resource control become ineffectual against the new conditions of resource extraction and could lead to over-use. Differences between historical rules and new local contexts therefore often lead to weak regulation as the incentives to obey such laws no longer outweigh the pressures residents face (Dietz et al., 2003, Ostrom and Nagendra, 2006, Ormsby, 2013 [20–22]). Institutions therefore need to adapt to novel threats and absorb such system shifts to ensure ongoing sustainable management (Ostrom et al., 1999, Adger 2000, Nkhata et al., 2017, Armitage 2005 [2,16,18,23]).

Much research conducted worldwide, however, demonstrates the poor capacities of institutions to adapt to change and the consequences are generally some degree of resource degradation (Kepe and Scoones 1999, Nkhata et al., 2017, Armitage 2005, Frost et al., 2007 [15,18,23,24]). This, in turn, has the potential to directly undermine the livelihood security of those dependent on such natural resources for their everyday needs. Specifically, in the developing world, interacting pressures such as modernization and political revolutions (including colonization and political independence) have been shown to greatly weaken historically effective systems of resource regulation. For example, Brown and Lassoie (2010) found in Cameroon that the installation of local modern institutions, resulting from a new democratic national political order, had diluted the importance of cultural beliefs in younger generations and had also blurred the legitimacy and authority of traditional leaders in the eyes of local communities. This contributed to a diminished adherence to traditional rituals associated with resource harvesting and ultimately led to the deterioration of the local resource base (Brown and Lassoie 2010 [25]). The institutions that previously governed resource use therefore failed to adequately adapt to and buffer against the external forces of cultural and political change and this ultimately produced a de facto open access resource system. Here, the opportunity to significantly improve

local socio-economic and landscape conditions through sustainable community forestry programs was curtailed by ineffective institutional structures (Brown and Lassoie 2010 [25]). Case studies that describe similar instances of erosion in customary resource systems and their impact on local livelihoods are widespread in the literature including examples from Zimbabwe (Frost et al., 2007, Mukamuri et al., 2003 [24,26]), Malawi (Kayambazinthu et al., 2003 [27]), Tanzania (Wilfred et al., 2007 [28]) and India (Ormsby, 2013 [22]).

South Africa is no exception to this general observation where changes in the political landscape, even at a national level, have impacted on local resource control and these changes have been linked to a growing number of reports describing the increasingly unsustainable use of natural resources, including firewood (e.g., Andrew et al., 2003, Shackleton and Stickler, 2015, Thondhlana et al., 2015 [29–31]). Even though it is accepted that institutional, and specifically traditional, management in natural resource use systems has decreased across the country (see Kirkland et al., 2007, Twine et al., 2003, [32,33]), most commentary in published South African literature has been cursory about this change rather than explicit. Despite large volumes of work describing key features of natural resource use, including their contributions to local livelihoods (see following section, Shackleton and Shackleton, 2004 [34]) and the numbers, types and volumes of species extracted (Shackleton and Stickler 2015, Dovie et al., 2003, Shackleton and Shackleton, 2000, Nott and Thondhlana, 2017, [30,35–37]), few studies (see Kepe and Scoones, 1999, Kirkland et al., 2007; Twine et al., 2003, [15,32,33]) have specifically examined natural resource institutions and the impacts of socio-political changes thereon in regions of South Africa. In order to close this knowledge gap, this paper therefore sets out to explore the current state of natural resource management, the actors involved and the degree of institutional functioning, specifically regarding firewood, in six villages of the resource-dependent region of Bushbuckridge, South Africa. Given the centrality of firewood as an essential energy source to millions of households in the country, the management of such resource harvesting is therefore fundamental to sustaining the livelihoods of these resource-dependent populations. Here, understanding how institutions have been shaped, changed and complied with by those that devise and observe them can offer important insights into the current and future reality of natural resource governance on the ground (Agrawal 2003 [38]) and these observations may be useful to other regions as they navigate similar economic, cultural and political transitions as those experienced in the communal lands of South Africa.

This paper starts by exploring the South African context in terms of both natural resource use and historical socio-political change. We then examine our case study region of Bushbuckridge where we look at the current systems of firewood regulation as a whole and attempt to establish the degree of institutional functioning in firewood management, as perceived by local residents. This is achieved by examining different stakeholders' perspectives on the roles and responsibilities of local institutions (e.g., traditional authorities, village community development forums, municipalities and community residents) in the regulation of firewood. These views were also used to determine why such institutional functioning is thought to exist (the drivers) and what could be done to improve such systems. The paper then ends by providing a summary of what was seen and describes the implications of these findings on resource use and livelihood security in the region.

1.1. Resource Use in South African Communal Lands

Although resource use characterized South African indigenous populations for centuries (von Maltitz and Shackleton, 2004 [39]), Apartheid-era policies saw the large-scale relocation of black populations onto small tracts of land known as Bantustans and this resulted in the majority of the South African populace effectively occupying only 13% of rural land. The establishment of these 'homelands' resulted in high population densities, households with limited access to other forms of livelihood capital, and often occurred in regions where climatic conditions were not particularly conducive to subsistence agriculture (Shackleton, 2004 [40]). While these policies were critical political mechanisms to control black citizens, this forced influx of relocated households dramatically increased

the number of households harvesting and consuming local environmental produce to survive, and this substantially intensified the resource use pressures on those small parcels of land (Shackleton, 2004 [40]). This dependence on resources continues today where many rural communities in South Africa continue to rely heavily on environmental resources for physical, financial and social security (Shackleton and Shackleton, 2004 [34]).

A key example is firewood, where research across the country shows that an overwhelming majority of investigated rural households continue to use firewood as their dominant energy source (Shackleton and Stickler 2015, Dovie et al., 2002, Nott and Thondhlana, 2017, Shackleton et al., 2004, Giannecchini et al., 2007, Madubansi and Shackleton, 2007 [30,35,37,41–43]) and this often occurs despite household electrification and government-funded free basic electricity allowances (Madubansi and Shackleton, 2007, Matsika et al., 2012 [43,44]). Here, firewood is generally collected free-of-charge from surrounding communal landscapes and is a cheap alternative to electricity. Given the high levels of poverty and lack of alternative livelihood options that often characterize these communities, firewood use is often a critical cost-saving strategy. Firewood is also seen as an important contributor to social and cultural practices, a role that other energy sources cannot fulfill (see White et al., 1997 [45]). From this, Shackleton et al. (2007) [46] expect that rural firewood use will remain unchanged at least into the medium-term as household financial insecurity and preferences will, for the most part, continue to sideline the use of substitute fuels.

Bearing this heavy dependence in mind, and in light of the growing number of households turning to the firewood trade to supplement incomes (Giannecchini et al., 2007 [42]), much research conducted in Bushbuckridge (Mpumalanga Province, South Africa) shows how local firewood availability has decreased in recent times under this intensifying pressure (Giannecchini et al., 2007, Matsika et al., 2012, Twine and Holdo, 2016 [42,44,47]). This has been shown in local environmental changes including decreases in overall tree density (Matsika et al., 2012, Shackleton et al., 2005 [44,48]), higher proportions of mature tree stems being chopped (Shackleton et al., 2005 [48]) and reduced availability of preferred firewood species (Madubansi and Shackleton, 2007 [43]). Changes to the ways in which households acquire firewood also reflect such regional shortages and include households travelling further distances to obtain firewood (Madubansi and Shackleton, 2007 [43]), more households buying firewood rather than self-collecting (Giannecchini et al., 2007, Madubansi and Shackleton, 2007 [42,43]), the harvesting from neighboring village commons (Twine et al., 2003 [33]) and the harvesting of less preferred species and size classes (Matsika et al., 2012 [44]). These studies form part of mounting evidence highlighting the intense resource exploitation of firewood in many rural South African landscapes, specifically in Mpumalanga, and in some cases these have been defined as unsustainable in the long-term (Matsika et al., 2012, Shackleton et al., 2005 [44,48]).

Critically, the consequences of these resource shortages on livelihoods cannot be overlooked. Madubansi and Shackleton (2007) [43] suggest that the increased harvesting times (as noted above) not only increase the opportunity costs associated with firewood collection, but also impact on the allocation of time and labor to other livelihood activities in the household. Furthermore, Brouwer et al. [49] comment that such shifts in the allotted resources to livelihood pursuits may render households further impoverished as fewer labor resources and less time are spent on other potential income-generating activities. These examples therefore show how the impacts of resource degradation extend beyond simply decreasing the volumes of available resources in a particular landscape, but also clearly affect other elements of resource users' livelihood strategies, decisions and well-being. Sustainable resource extraction is therefore fundamental not only to ensuring landscape conservation, but also to reducing socio-economic vulnerability of those dependent on such resources.

Many authors attribute the observed over-harvesting to both burgeoning populations as well as to the fast-eroding systems of local control (Kirkland et al., 2007, Twine et al., 2003, von Maltitz and Shackleton 2004, Giannecchini et al., 2007, Cousins et al., 2007 [32,33,39,44,50]). In terms of the latter, many of these resource-use systems are thought to have transitioned from well-managed communal property to essentially 'open-access' firewood systems (Kirkland et al., 2007, von Maltitz

and Shackleton 2004, Cousins et al., 2007 [32,39,50]). The following section unpacks in more detail the different factors that are believed to be reducing the effectiveness of local firewood management in many of South Africa's rural communities.

1.2. Past and Present Institutional Governance of Communal Lands in South Africa

In the pre-colonial era, natural resource harvesting was regulated by the local traditional authorities, specifically the chiefs and headmen (known locally as *Ndunas*) (Thornton 2002 [51]). During both the colonial and Apartheid regimes, the then-governments used these same traditional institutions to apply their own set of rules regarding resource use. Therefore, traditional institutions became part of the Apartheid homeland bureaucracy. The implementation of local harvesting systems, based on the guilty paying fines or completing community service for disobeying specific resource rules, controlled, to some extent, resource harvesting in the region (Twine 2005 [52]). This local control, however, has gradually yet noticeably weakened, particularly since the birth of democracy in 1994 (Twine et al., 2003, Cousins et al., 2007, Thornton 2002, Twine 2005 [33,50–52]). This has been attributed to three dominant factors. Firstly, the induction of the new democratic government triggered a change in the perceptions of village residents, particularly among the youth, regarding the authority and power of traditional leaders. The perceived close, often corrupt, ties between traditional leaders and the former Apartheid government bred widespread mistrust and suspicion of tribal leadership both during and after Apartheid (King 2005 [53]). The continuation of tribal institutional rule, despite democracy, has therefore generated pervasive discontent in much of the rural population (King 2005 [53]), and in many ways has led to blatant disrespect for local traditional leaders and their attempts at resource management (Twine et al., 2003 [33]).

Secondly, the new government, upon appointment, reduced the financial resources previously granted to traditional authorities. This reduced the capacity of local leaders to hire patrolmen and thereby police communal areas and this, in turn, has severely impeded their ability to enforce natural resource management rules (Kirkland et al., 2007, Twine 2005 [32,52]). Thirdly, the inauguration of the new government generated confusion regarding the modern function of the hereditary traditional authorities in a new democratic society (Twine et al., 2003, Cousins et al., 2007 [33,50]). Other forms of governance, including provincial officials, local municipalities and village-level governance structures, emerged under the democratic dispensation. Traditional leaders now share authority and responsibility with these newly established institutions, but some research shows that the roles and responsibilities of these separate groups can be undefined, ambiguous and often conflicting (Thondhlana et al., 2015, Kirkland et al., 2007, King 2005, [31,32,53]). These uncertainties and capacity insufficiencies have created an 'institutional vacuum' in the region, where the system of governance has become increasingly unclear and the access to and consumption of natural resources is no longer as strongly moderated (Kirkland et al., 2007, Twine et al., 2003 [32,33]).

Little research has set out to identify how natural resources are actually regulated in post-1994 South Africa or what local leaders themselves deem as their exact function in these systems. Given the wealth of data and insight on socio-ecological systems in Bushbuckridge resulting from sustained long-term research conducted by University of the Witwatersrand and other institutions in the region, Bushbuckridge was identified as a key opportunity for this research. The aim of this study was therefore to explore the current systems of firewood regulation in Bushbuckridge as a whole and to establish the degree to which relevant institutions were carrying out their duties in regulating firewood harvesting, as perceived by local residents. In so doing, the study also sought to investigate some of the key factors affecting the levels of institutional functioning observed.

2. Materials and Methods

2.1. Study Site

This study was conducted in six villages spanning two chieftaincies that fall under the Bushbuckridge local municipality in Mpumalanga Province ($31^{\circ}0'–31^{\circ}35' \text{ E}$; $24^{\circ}30'–25^{\circ}0' \text{ S}$), South Africa (see Figure 1). In the Amashangane chieftaincy, the three villages were New Forest A, Merry Pebble Stream (MP Stream) and Arthur Stone and in the Mnisi chieftaincy, the study villages were Cottondale, Burlington and Islington. In order to examine similarities and differences in the firewood regulation systems of different villages, the study villages were purposively selected as they share similar patterns in biophysical and socio-economic conditions, i.e., any differences noted in the regulation systems were unlikely to result from biophysical and socio-economic characteristics.

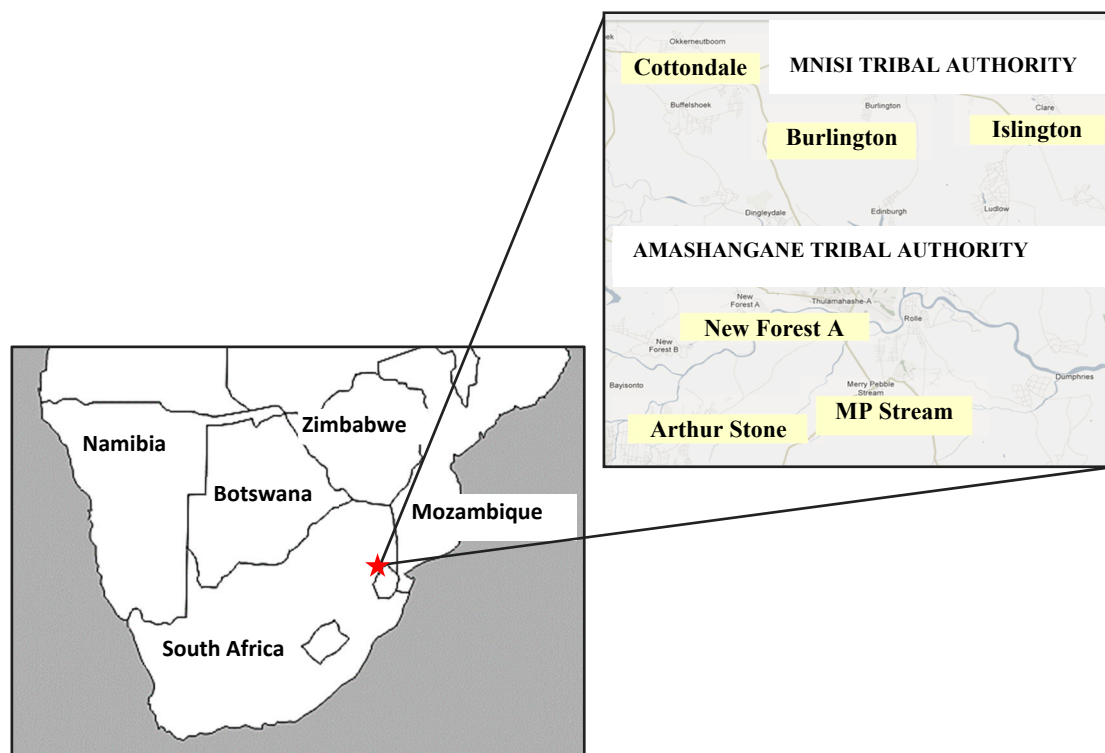


Figure 1. A map of the six study villages in the Bushbuckridge region, South Africa.

2.2. Biophysical Conditions

The Bushbuckridge local municipality is situated in the north-eastern portion of Mpumalanga province and is bordered in the east by Kruger National Park. The region is characterized by hot humid summers and mild winters with an annual temperature averaging 22°C . The mean annual rainfall ranges from 700 mm to 500 mm, from west to east (Shackleton et al., 1994 [54]). The vegetation type is broadly defined as semi-arid savanna woodland, where species of Combretaceae and Mimosaceae prevail throughout the region (Emanuel et al., 2005 [55]).

2.3. Socio-Economic Characteristics

The six villages fall within the boundaries of the former homeland of Gazankulu. Despite the dissolution of the homeland system in 1994, many of these regions, including Bushbuckridge, remain characterized by poor economic development and low employment levels as during Apartheid (Thornton 2002 [51]). Most households rely heavily on migrant labor remittances and government social grants (Kirkland et al., 2007, Shackleton and Shackleton 2000, Thornton 2002 [32,36,51]),

with subsistence agriculture and natural resource harvesting playing a significant role in supplementing cash-based incomes (Emanuel et al., 2005, Shackleton 2000 [55,56]). Dependence on natural resources, such as firewood, wild fruit, and medicinal plants remains widespread in this region (Ifegbesan et al., 2009 [57]), and these products are generally collected from the communal lands that surround each village settlement and fall under communal tenure.

2.4. Institutional Context

The Bushbuckridge local municipality covers roughly 2590 km² and is one of five local municipalities of the Ehlanzeni district of Mpumalanga Province (Bushbuckridge Local Municipality, 2014, [58]). The municipality is divided into 37 wards and each ward consists of 5–10 villages. Within this region, all communities are governed by dual leadership structures: civic government and Traditional Councils (Thornton, 2002 [51]) that occur at different spatial scales (see Table 1).

Community Development Forums (CDFs) represent the lowest tier of municipal governance and comprise two representatives from each village civic group (Community Based Organization or Civic Association) together with the village *Nduna* or Headman (a representative of the Chief's Traditional Council) (Cousins et al., 2007 [50]). The next level of governance is the ward council and this consists of delegates from CDFs across different villages as well as a nominated Ward Councilor. These councils present village-level matters to the local municipality and are answerable both to higher-level municipal offices as well as to community-level CDFs (Cousins et al., 2007 [50]).

In terms of traditional leadership, the Chief's jurisdiction generally extends to between ten and 12 villages. In each of these villages, the Headman or *Nduna* acts on behalf of the Chief. The *Ndunas* meet regularly to form Traditional Councils that, under the directive of the Chief, discuss issues around development and general village concerns. The Councils also resolve individual or household disputes and try local cases brought before them (von Maltitz and Shackleton 2004, Cousins et al., 2007 [39,50]). The traditional authorities also theoretically regulate the use of natural resources in the village commons.

Table 1. Institutions operating at various spatial scales across the Bushbuckridge study site.

Scale	Municipal Government	Traditional Authority
Village level	Community Development Forum (CDF)	<i>Nduna</i>
Meso level	Ward Councilor, Ward Council	Chief, Traditional Council
Municipality level	Local municipal government	

2.5. Data Collection

Fieldwork, comprising community focus groups and informant interviews, was conducted in September and October 2011. Five focus groups were carried out in each village giving a total of 30 focus groups across the study. These groups were stratified by age (18–30, 30–50, >50) and gender to avoid possible patriarchal biases. Due to the pervasiveness of migrant labor in the area (see Kahn et al., 2012 [59]), economically active men (aged 30–50) were largely absent and were therefore unavailable to participate. Group sizes varied between three and 12 people, with the mean group size being roughly six people. Each focus group was run as a semi-structured group interview and was conducted in the local language of Shangaan via a translator. These discussions, although flexible, aimed to address specific predetermined topics and were designed to elicit information on the following: (1) Why firewood is used and laws about firewood; (2) The implementer of firewood laws; (3) The local firewood permitting system; (4) The roles and responsibilities of different entities; (5) The main challenges in regulating firewood; and (6) Potential solutions to prevent future over-harvesting. The answers recorded were the final consensus answers reached by the group. To supplement general question-and-answer-based information, some Participatory Rural Appraisal techniques were also used. For example, each focus group was asked to rank all the institutions according to their level of

responsibility in firewood regulation. Each of these institutions was then given a score from nine (9) to one (1) (representing most important institution to least important institution respectively) and these scores were then averaged across all focus groups.

In order to obtain a diversity of perspectives from local leadership on firewood regulation systems, representatives from traditional institutions and democratic structures from each hierarchical level (see Table 1 above) were accessed. In-depth interviews were therefore carried out with the *Nduna* as well as the chairperson, secretary and another member of the CDF of each village. At the ward level, each of the Ward Councilors as well as Chief Mnisi (from Mnisi Traditional Authority) and the secretary of the Amashangane Traditional Affairs (in lieu of the Chief who was away) were interviewed. Attempts at interviewing municipal or provincial officials were unsuccessful despite extensive enquiry. A total of 30 people were interviewed. The interviews were all conducted in the local language of Shangaan via a translator and were 30–40 min long, depending on the length of responses. In the interviews, the same questions as those in the focus groups were asked and data on perceptions of firewood governance and the institutional roles thereof were gathered. Responses from focus groups and interviews were then categorized and coded to provide numerical data for analysis. These data were then totaled for comparison between villages. In terms of the rank score data, the mean rank score was calculated for each institutional actor combining data from across all villages. Direct quotes from both the focus groups and interviews were also used as supporting data to the quantitative findings. Ethics clearance was obtained from the Wits Non-Medical Human Subjects Ethics Committee (Protocol number: H110913), and permission from each village's *Nduna*, heads of the CDFs and Chiefs was also obtained prior to data collection.

3. Results

3.1. Governance Regime

3.1.1. Perceptions Regarding the Implementer of Local Firewood Laws

It was unanimous among community members and leaders alike that local laws about harvesting firewood existed. However the specifics of these varied to such an extent that enumeration of responses was unfeasible. That being said, a common law mentioned by most groups was that the cutting of live trees for firewood was strictly prohibited. Most focus groups (22 of 30) and leaders (18 of 30) across both chieftaincies cited the Chief as the primary implementer of local firewood laws. Although other agents in traditional institutions, such as the *Nduna* and the Chief's police, and non-tribal authorities including nature conservation rangers and various government departments, were also mentioned, these were each only cited once.

3.1.2. Permission

Most respondents (all leaders and 29 of 30 focus groups) agreed that permission was required to harvest firewood. While most parties also agreed that the Chief was the only authority who could issue firewood permits, a handful of focus groups (5) and two leaders also indicated that the *Nduna* could grant permission. Respondents were divided as to who needs to obtain such permission, be it all harvesters or only commercial harvesters. Many respondents (13 focus groups and 23 leaders) also agreed that everyone requires a permit. However, seven groups and two leaders said that it was only commercial harvesters who needed permission because they were collecting much larger firewood loads. Finally, variations in the price of the harvesting permits were also seen across all respondents. Each focus group and leader offered a different value both for the permit and the harvestable amount it allowed. These ranged from 'no payment required', to R5 per single piece of wood to R100 for two or three days of continuous harvesting. Eight focus groups also conceded that they did not actually know the cost of a permit.

3.1.3. Roles of Different Leaders

Each group was asked to identify the roles of different institutions and these were clustered according to the level of responsibility required to carry these out i.e., high, intermediate and none. Every focus group and every leader acknowledged that the Chief's duties in firewood management occurred at the highest tier of responsibility (Tables 2 and 3). The supremacy of the Chief's duties was indicated by the 24 focus groups and 11 leaders that saw him as the 'ultimate authority' in firewood governance (Tables 2 and 3). Descriptions of his role included 'overseer of everything', 'firewood [is] his responsibility' and the 'regulator of the land'. The next two most commonly cited responsibilities were those of fining transgressors and having security that actively patrol the communal lands (Tables 2 and 3). These responsibilities immediately ascribe an upper level of authority to the Chief, who has the power to finalize punishment for lawbreakers and who also has 'lower level' personnel under his command.

Unlike the consistent descriptions of the Chief, discussions about the role of other institutions generated varied responses across all villages. For example, while 18 focus groups stated that the *Nduna* could fine guilty parties for firewood transgressions, another eleven groups stated outright that he could not (Table 2). Similarly, 12 groups suggested that the *Nduna* had active security patrolmen, while another four groups said that he had 'no responsibility' in firewood regulation at all (Table 2). The responses about the *Nduna's* responsibilities were also equally divided between leaders (Table 3).

These differences in perceptions were also seen in the descriptions of the CDF, Civic Association and community members generally. Here, the focus groups consistently suggested that these institutions had 'no responsibility' and only occasionally ascribed duties such as 'reporting illegal harvesters to a higher power' or 'advising not to harvest' (Table 2). In contrast, the leaders more commonly stated that these organizations, and the CDF specifically, could 'report illegal harvesters to a higher authority', could 'advise community members not to harvest' and could 'call meetings' (Table 3). In the same way, while 23 and 25 focus groups stated that the municipal and provincial government, respectively, had 'no responsibility' in firewood management (Table 2), leaders occasionally suggested that these officials did have some intermediate role to play (Table 3). From this, the Chief appears to maintain a high position of prominence in firewood regulation across the region, the *Nduna* has varied, if not conflicting, responsibilities and the other institutions appear to play a minor, if any, role.

Table 2. The frequency of selected duties thought to be undertaken by different institutions as cited by community focus groups ($n = 30$) pooled across all villages. Values in parentheses indicate the proportion of groups in which the duty was cited.

[illegible]

Table 3. The frequency of selected duties thought to be undertaken by different institutions as cited by leaders ($n = 30$) pooled across villages. Values in parentheses indicate the proportion of groups in which the duty was cited.

	No Responsibility		Intermediate Responsibility			High Responsibility		
	No Responsibility	Cannot Fine	Report Illegal Harvesters to a Higher Power	Advise not to Harvest	Call Community Meetings	Can Fine	Ultimate Authority	Has Security that Actively Patrol
Chief	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	15 (0.50)	11 (0.37)	8 (0.27)
Nduna	0 (0.00)	10 (0.33)	11 (0.37)	4 (0.13)	4 (0.13)	10 (0.33)	0 (0.00)	10 (0.33)
Community Development Forum	7 (0.23)	0 (0.00)	12 (0.40)	12 (0.40)	4 (0.13)	0 (0.00)	0 (0.00)	0 (0.00)
Civic Association	10 (0.30)	0 (0.00)	8 (0.27)	6 (0.20)	1 (0.03)	0 (0.00)	0 (0.00)	0 (0.00)
Community Members	17 (0.57)	0 (0.00)	4 (0.13)	2 (0.07)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Municipal Government	9 (0.30)	0 (0.00)	5 (0.17)	0 (0.00)	1 (0.03)	0 (0.00)	1 (0.03)	0 (0.00)
Provincial Government	7 (0.23)	0 (0.00)	2 (0.07)	3 (0.10)	2 (0.07)	0 (0.00)	2 (0.07)	1 (0.03)

3.2. Relative Importance of Institutions in Firewood Regulation

Both the Chief and the *Nduna* were consistently classed as the two most important authorities in terms of firewood governance across all six villages (Table 4). The Chief was repeatedly assigned a first or second position of importance over all other parties and such high rankings are reflected in the mean scores across villages that range from 8.2 and 9.0 (Table 4). Similarly, the range of the *Nduna*'s scores (1.6–8.0), although more diverse than those of the Chief, still designated him the second most important institution in each village and reinforced the notion, as suggested in some focus group sessions, that he is second-in-command to the Chief. This range of scores also corresponded to differing levels of responsibility the *Ndunas* are perceived to hold by different groups, as seen in the section above.

Table 4. Mean rank scores of local institutions with regard to their importance in firewood regulation, as perceived by community focus groups ($n = 30$). 9.0 is highest possible rank.

Institution	Mean Rank Scores	
	Total	Range
Chief	8.5	8.0–9.0
<i>Nduna</i>	7.0	1.6–8.0
Community members	2.5	1.2–5.0
Civic Association	1.9	0.0–5.4
Community Development Forum (CDF)	1.7	0.0–2.6
Provincial Government	1.2	0.0–2.6
Municipal Government	0.9	0.0–4.0

The mean rank scores of the other institutions varied more widely between villages (Table 4) and this could indicate village-level differences in the roles of these institutions, especially Civic Association and community members. Having said that, none of these institutions generated a mean rank score higher than 3, which suggests that despite possible village-level differences, each of these groups is regularly perceived as being lower in relative importance than the Chief and the *Nduna*.

Ambiguity around the importance of provincial and municipal government in firewood governance was evident in the ranges of scores generated in the focus group discussions (Table 4). Three focus groups maintained that the provincial government was the highest authority as ‘all departments fall under the provincial government’ and it ‘gives the law to the Chief’. In contrast, other focus groups failed to mention the provincial government at all. Similar inconsistencies are noted for the municipal government. These discrepancies in community perceptions may result from difficulties between differentiating ‘level’ of authority and their importance in actually regulating firewood harvesting. As such, some community groups may have recognized the importance of government bodies in developing legislation and in their ‘upper level’ governance operations and were therefore highly regarded, while others overlooked the importance of such institutions as their on-the-ground presence or degree of active regulation was scarce or limited.

3.3. Firewood Regulation Issues

One of the most important challenges to effective firewood regulation, as noted most frequently by focus groups and second most frequently by leaders, was community members’ noncompliance with well-established firewood laws (Figures 2 and 3). Such disregard for the local rules was encapsulated in statements such as ‘they [the community] do know the laws but they keep breaking them’, ‘lots of people break the law’ and ‘everyone harvests, nobody cares’. This concern was raised almost twice the number of times as the second most cited response (Figure 2). Although some focus groups viewed such disobedience as insubordination where it is just ‘human nature to break the rules’, a far more common perception was that villagers could not afford to buy permits and were therefore forced ‘to harvest [illegally] to survive’. These constraints of poverty and unemployment were also emphasized in suggestions of households relying on firewood as a coping strategy because they are unable to pay for electricity or alternative energy

sources. This issue, as stated in one focus group, of '[e]veryone harvests. Electricity is expensive' was the most frequently cited challenge by leaders (Figure 3).

Another common issue, raised by both leaders and community members, was that of 'threats to security' as well as 'limited security' (Figures 2 and 3). In the first case, patrolling rangers are beaten, shot, threatened with bewitchment or faced unwarranted aggression by harvesters. As a result, rangers are increasingly reluctant to patrol specific areas and illegal harvesting continues unabated in certain communal lands. In the second case, there are not enough patrolmen available to adequately cover all the communal lands in the area. One focus group highlighted that the Chief only had three security men who had to patrol the entire chieftaincy. This issue was thought to stem from reduced Traditional Council budgets.

An important discrepancy in responses between community members and leaders related to suggestions of dissension between village leaders and their communities, which here refers to issues of bribery, corruption, nepotism and lack of trust as explicitly stated by respondents. Interestingly, while this discord was collectively mentioned nine times in village talks, they were only cited twice in leadership answers (Figures 2 and 3). In contrast, suggestions of the community being 'uneducated' or unknowledgeable about the firewood regulation processes and 'inactive' in issues of firewood were raised by leaders, but were not mentioned by focus groups at all.

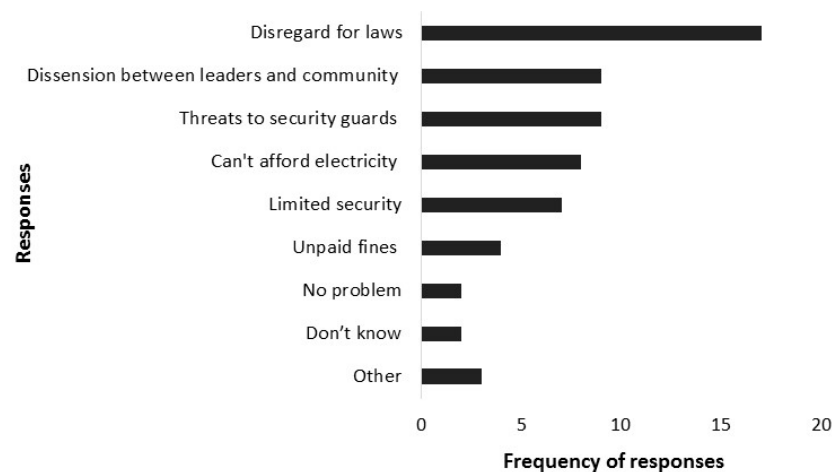


Figure 2. Frequency of firewood governance issues raised in focus groups ($n = 30$) across all villages.

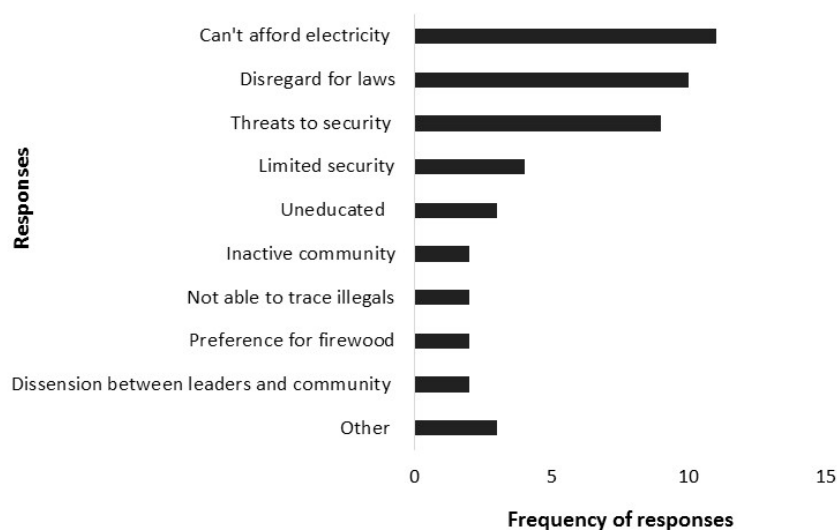


Figure 3. Frequency of firewood governance issues raised by leaders ($n = 30$) across all villages.

4. Discussion

4.1. Local Firewood Management Systems

4.1.1. Importance of Traditional Leaders over Democratic Structures

Across our research villages, there was little contestation that the Chief, and traditional authorities in general, are the over-riding powers in firewood governance. This perception is evidenced in the consistency of responses across all six villages where the Chief was repeatedly cited as the ultimate authority in firewood regulation, the primary implementer of firewood laws and, in most cases, the most important institution in firewood harvesting management. Although the local *Ndunas* were also ranked as highly important, perhaps suggesting a second-in-command authority, the differing views of their practical responsibilities produce an unclear picture of their actual role in firewood regulation. These inconsistencies may stem from chieftaincy- and/or village-level differences in the functions of these local level leaders and future work is required to unpack these potential nuances. In contrast, the other governance structures, such as the Community Development Forum (CDF), were consistently considered to either have no responsibility in firewood management or to fall under the directive of one of the traditional leaders. From this, the bulk of responsibility in firewood governance is therefore understood to lie with traditional authorities rather than local democratic institutions. Given the numerous examples throughout the developing world in which traditional leaders remain the primary governors of natural resources (see Brown and Lassoie 2010, Mukamuri et al., 2003, Kayambazinthu et al., 2003, Kajembe et al., 2003 [25–27,60]), this result is unsurprising. Importantly, though, the low prominence of state conservation agencies is of interest and their perceived role in regulating the harvesting of resources should be explored further.

These results suggest that the emergence of modern institutional structures have not had as much impact on the perceived functional roles of traditional authorities in natural resource management as expected. Despite assertions by some that confusion over the roles of different institutions has decreased local firewood regulation (see Kirkland et al., 2007, Twine et al., 2003 [32,33]), the findings here indicate that the roles of traditional leaders and democratic institutions appear separate and quite well-defined in the study villages. Here, traditional institutions remain closely linked to natural resource regulation while democratic groups (CDF, Civic Associations etc.) are more involved with service delivery and community development issues. This was confirmed by both community residents and leaders across villages. While studies elsewhere show that the establishment of local democratic institutions can create institutional uncertainty between the two groups (Brown and Lassoie 2010, Mukamuri et al., 2003, Kayambazinthu et al., 2003, Clover and Eriksen 2009 [25–27,61]), this tension is unlikely to be the primary contributing factor to the reduced effectiveness of firewood systems seen in these specific villages.

4.1.2. General Weakening of Institutional Control

Although the emergence of democratic institutions appears to have had little bearing specifically on the perceptions of traditional leadership in firewood management, three lines of evidence indicate a generalized reduction in firewood regulation across all the study villages. Firstly, no single group or leader described a set of firewood laws that was described by any other group. Many of the laws were only mentioned once and this meant that the laws were too variable to enumerate in this study. While this assortment of laws may point to a complex and extensive system of firewood regulations, it may also suggest that knowledge of firewood laws may be poorly communicated or weakly enforced in these communities. Secondly, although almost all respondents acknowledged that permission was required to harvest firewood and that the Chief was the primary issuer of permits, there was no consensus as to the amount required to pay for the permit or what the permit authorizes the holder to harvest. It is possible that these vague and incongruous responses, evident in both chieftaincies, indicate that very few, if any, households ever actually obtain permits or that leaders

ever issue them. This could also point to decreased compliance to known firewood regulations around obtaining permission. Finally, and linked to the above, one of the most pressing governance issues, as cited by both community and leader respondents, was villagers' non-compliance with firewood laws. In discussions, this sentiment often referred to the instances of live tree harvesting that, although prohibited, were thought to have intensified in recent times and have been noted elsewhere (Kirkland et al., 2007, Giannecchini et al., 2007 [32,42]). In the words of one community respondent, harvesters overlook established traditional laws "to harvest as they please" and "everybody harvests, nobody cares". These concerns point to the increase in perceived lawlessness with which harvesters, both commercial and domestic, access firewood.

These findings could suggest a widespread reduction in compliance with and enforcement of traditional firewood laws in these study villages and could signify a weakening of local institutional control, as noted in other literature (Kirkland et al., 2007, Twine et al., 2003, Giannecchini et al., 2007 [32,33,42]). Across rural Africa, many studies point to similar levels of insubordination by communities and reflect on the increasingly diluted systems of governance by historically well-respected tribal leaders. Mukamuri et al., 2003 [26], for instance, describe how in some regions of rural Zimbabwe, community members increasingly contravene local harvesting laws by cutting previously sacred trees and these activities undermine the traditional systems of miombo woodland regulation.

These cases above exemplify a cycle of firewood degradation where livewood harvesting, for both domestic and commercial purposes, is both a cause and a symptom of local deadwood scarcity. Although it is recognized that often harvesters have few alternative livelihood options and are left with no choice but to harvest live trees, the continuation of live tree chopping has the possible and indeed high likelihood of further decreasing the natural resource supply and rendering resource-dependent households further impoverished in the areas studied (Kirkland et al., 2007, Twine et al., 2003 [32,33]). This cycle evinces the inter-dependence and inter-connectedness of social systems and the landscapes on which they rely, where changes to one feature ultimately feedback, directly or indirectly, to modify another (Twine, 2005, Liu et al., 2007 [52,62]).

Although it is critical to recognize situations of weakened natural resource management, it is often even more important to identify and understand what factors have led to those governance changes in order to develop suitable interventions that promote sustainable management, and thereby reduce poverty and improve livelihoods (Kepe and Scoones, 1999, Potts et al., 2016 [15,17]). As such, the following section delves into the possible drivers of the weakened institutional functioning described above.

4.2. Drivers of Weakening Traditional Resource Control in Bushbuckridge

4.2.1. Poverty-Driven Use

A common theme throughout this study was that of poverty-driven firewood use. Leaders, more so than community members, cited this as one of the biggest firewood governance issues, where households, out of poverty, were left with no choice but to continue harvesting both live and deadwood. It was emphasized by leaders here that firewood dependence was a last resort for community members and that livewood harvesting, although proscribed, stems from desperation, necessity and poverty, rather than from malevolence. Some leaders gave the impression that they found themselves in a "catch-22" situation, where although acknowledging that livewood harvesting was illegal, saw residents having no other option but to harvest livewood in a firewood-scarce and poverty-stricken environment. Given these perceptions, we argue that some leaders may be consciously choosing to overlook the illegal harvesting that has intensified across the landscape. While the decision of local leaders to turn a 'blind eye' may stem from acts of political expediency (see below), Mukamuri et al., 2003 [26] note that local leaders in certain regions of rural Zimbabwe, despite having the capacity and authority to detain firewood transgressors, are consciously choosing not to because they believe illegal harvesters are doing so out of livelihood destitution. In this

study, such empathy and consequent leniency may therefore be an important feature of the observed deterioration of local control.

4.2.2. Political Self-Interest

Although poverty-driven use may be an important factor influencing leaders' degree of law enforcement, another reason could be more closely related to that of leaders maintaining their social standing in the community. In these villages, although this was never specifically stated by respondents, political self-interest may be at play in the easing of firewood regulations. For instance, von Maltitz and Shackleton 2004 [39] describe how in other areas of rural South Africa, traditional leaders are no longer enforcing local regulations as strictly or chastising lawbreakers as regularly out of fear of losing local votes to democratically-elected councilors. Here, competition for local support with newly emerging institutions has prompted tribal leaders to be more lenient on community transgressors, leading to an increasingly relaxed governance system (von Maltitz and Shackleton 2004 [39]). In our study region, although there appears to be no overt competition between the different leadership groups on issues of natural resource regulation (see Section 4.1.1. above), politicking in the form of firewood leniency may be one mechanism by which some traditional authorities are attempting to regain a degree of local legitimacy and to win back standing in their communities. This may be particularly true given the weaknesses in their institutional credibility and trust in the eyes of those they are meant to govern (see Section 4.2.3 below).

4.2.3. Decreased Trust in Local Institutions

A key issue raised in discussions was that of discord and dissension between community members and their leaders. That is, the perceived bribery, corruption and nepotism exhibited by some of the village and regional leaders had created a sense of distrust between them and the communities they intend to rule. Concerns over intensified commercial harvesting, the perceived lawlessness with which some residents harvest as well as increasing threats of violence towards patrolmen may also be indicative of these strained relations.

Trust between stakeholder parties has been identified as a critical factor in effective natural resource management (Vaske et al., 2007, Stern 2008a [63,64]) and distrust for leadership has been shown to fuel non-compliance with regulations and stimulate open defiance of authority in systems across the globe (Brown and Lassoie 2010, Kayambazinthu et al., 2003, Thondhlana et al., 2015, Stern 2008a, Stern 2008b, Oyono 2009 [25,27,31,64–66]).

Following this, the impact of reduced social trust and the weakened legitimacy of traditional leaders should not be underestimated in the deterioration of resource regulation and in the increasing powerlessness of traditional authorities to regulate in these villages. It is this cycle of reduced authority, increased disobedience and associated institutional collapse that some authors consider the basis for the 'open access' nature of communal land systems observed in other parts of Africa (Thondhlana et al., 2015, Jones 1999, Luoga et al., 2005 [31,67,68]).

4.2.4. Decreased Financial Capacity of Governance Structures

Finally, our results confirm much of other South African literature (see Kirkland et al., 2007, Twine 2005 [32,52]) that speaks of the explicit links between weakening traditional resource control and decreased financial support from government. Here, the ineffectiveness of traditional leaders to implement resource laws was highlighted in various ways, including how authorities do not have enough security to patrol the communal lands and that they cannot trace illegal harvesters. These issues speak to capacity insufficiencies where, even in contexts where leaders may seek to enforce laws, budgetary constraints mean that they are largely incapable of maintaining previous firewood governance systems. In a similar study, Twine et al., 2003 [33] note that traditional authorities themselves asserted that one of the main factors impeding their implementation of resource laws was reduced government funding.

5. Conclusions

With rural poverty and natural resource dependence remaining widespread in South Africa, there is an indisputable need to implement strategies and reforms that seek to improve landscape function and advance livelihood opportunities in such resource-dependent areas. While the results of this study add support to the notions of weakening local governance and their impact on firewood availability in Bushbuckridge specifically, the insights gained have broader applicability to other common property systems. The first of these is that enduring institutions do not necessarily translate into effective institutions. In this system, the institutions involved in natural resource management remain firmly in place, however, they have failed to account for the social, political, economic and environmental changes that currently shape the mechanisms by which natural resources are being used. This oversight has meant that regulations and the institutions meant to enforce them are fixed in historical policies that are no longer appropriate to deal with the new stresses and pressures both within and on the system. This weakened capacity to deal address new forces, such as the reduced resource base, has meant that other changes have evolved in their place, including decreased obedience to laws by residents. What we need in order to combat landscape degradation and livelihood vulnerability, such as already appears in Bushbuckridge but also elsewhere, is to increase the capacity of such institutions to adapt and evolve to changing circumstances.

Secondly, the findings from this study shed new light on the complexity of factors that drive the effectiveness, or indeed the ineffectiveness, of institutions in carrying out their functions. Where previously it was widely accepted that traditional authorities in Bushbuckridge could not enforce resource harvesting laws because of certain exogenous factors, such as their reduced financial capacity, here we see a multiplicity of factors that contribute, individually and in combination, to the weakening of local resource control. Importantly, these new insights into the specific drivers of regional governance were achieved only by coupling community and leader perspectives. The inclusion of these new understandings helped unpack more fully the complexities of local issues and can also be used in the development of more effective interventions. Here, for example, simply increasing Traditional Council budgets or providing more patrolmen does not address the tangled network of factors resulting in the illegal harvesting seen above. Rather the multi-dimensional nature of such resource-use systems calls for the development of policy and programs that engage with such complexity and offer solutions that are holistic and multi-pronged in approach (Nkhata et al., 2012, [69]). We therefore argue that future work should seek to engage as many stakeholders as possible where a diversity of views, perspectives and experiences add more fully to understanding the nuances in such systems that other more singular-focused research may overlook.

Finally, three of the four major drivers of weakened institutions in this case were based on the relationships between the leaders (regulatory institutions) and their communities. Some leaders may have chosen to withhold enforcement on penalties for reasons of compassion and/or political self-interest. Likewise, communities' perceptions of their leaders, both from current practices (e.g., bribery and nepotism) and historical affiliations, impacted on communities' attitudes towards and compliance with firewood regulations. We would argue that these findings point to the underestimated role of personal motivations, beliefs and relationships in shaping institutional effectiveness in resource use systems. Here, without understanding the relationships between the different entities, we fail to acknowledge how successful natural resource governance can be achieved in any landscape (de Castro, 2016 [70]). From this, future studies of both resource use systems and socio-ecological systems in general should focus on the relationships between resource users and their regulatory institutions from a more personal perspective to not only more fully understand the drivers of specific degrees of functioning but also to develop more effective strategies for future resource use regulation.

Acknowledgments: Funding for fieldwork expenses was provided by the University of the Witwatersrand.

Author Contributions: Sarah Findlay and Wayne Twine conceived and designed the study. Sarah Findlay carried out the data collection and analysis, wrote the first draft of the paper, and did the bulk of the revisions. Wayne Twine contributed to the revisions and critical reviews of the various drafts of the paper.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Hardin, G. Tragedy of the Commons. *Science* **1968**, *162*, 1243–1248. [[CrossRef](#)] [[PubMed](#)]
2. Ostrom, E.; Burger, J.; Field, C.B.; Norgaard, R.B.; Policansky, D. Revisiting the Commons: Local Lessons, Global Challenges. *Science* **1999**, *284*, 278–282. [[CrossRef](#)] [[PubMed](#)]
3. Poteete, A.R.; Ostrom, E. Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management. *Dev. Chang.* **2004**, *35*, 435–461. [[CrossRef](#)]
4. Hartter, J.; Ryan, S.J. Top-down or Bottom-up? Decentralization, Natural Resource Management and Usufruct Rights in the Forests and Wetlands of Western Uganda. *Land Use Policy* **2010**, *27*, 815–826. [[CrossRef](#)]
5. Ostrom, E. *Governing the Commons*; Cambridge University Press: Cambridge, UK, 1990; p. 294.
6. Wells, M. Institutions and Incentives for Conservation. *Biodivers. Conserv.* **1998**, *7*, 815–835. [[CrossRef](#)]
7. Acheson, J.M. Institutional Failure in Resource Management. *Annu. Rev. Anthropol.* **2006**, *35*, 117–134. [[CrossRef](#)]
8. Goetz, A.M. Institutionalizing Women’s Interests and Accountability to Women in Development. *IDS Bull.* **1995**, *26*, 1–10. [[CrossRef](#)]
9. Folke, C.; Holling, C.S.; Perrings, C. Biological Diversity, Ecosystems, and the Human Scale. *Ecol. Appl.* **1996**, *6*, 1018–1024. [[CrossRef](#)]
10. Belcher, B.; Ruiz-Perez, M.; Achdiawan, R.I. Global Patterns and Trends in the Use and Management of Commercial NTFPs: Implications for Livelihoods and Conservation. *World Dev.* **2005**, *33*, 1435–1452. [[CrossRef](#)]
11. Barrett, C.B.; Lee, D.R.; McPeak, J.G. Institutional Arrangements for Rural Poverty Reduction and Resource Conservation. *World Dev.* **2005**, *33*, 193–197. [[CrossRef](#)]
12. Cocks, M.; Bangay, L.; Shackleton, C.M.; Wiersum, K.F. “Rich Man Poor Man”—Inter-Household and Community Factors Influencing the Use of Wild Plant Resources amongst Rural Households in South Africa. *Int. J. Sustain. Dev. World Ecol.* **2008**, *15*, 198–210. [[CrossRef](#)]
13. Seidman, R.B. State, Law and Agricultural Institutions: A Theoretical Framework. In *Transforming Southern African Agriculture*; Seidman, A., Mwanza, K., Simelane, N., Weiner, D., Eds.; Africa World Press: Trenton, NJ, USA, 1992; pp. 19–30.
14. Graham, J.; Amos, B.; Plumptre, T. *Governance Principles for Protected Areas in the 21st Century*; A Discussion Paper; Ottawa Institute on Governance, Parks Canada and the Canadian International Development Agency: Ottawa, ON, Canada, 2003; p. 50.
15. Kepe, T.; Scoones, I. Creating Grasslands: Social Institutions and Environmental Change in Mkambati Area, South Africa. *Hum. Ecol.* **1999**, *27*, 29–53. [[CrossRef](#)]
16. Adger, W.N. Social and Ecological Resilience: Are They Related? *Prog. Hum. Geogr.* **2000**, *24*, 347–364. [[CrossRef](#)]
17. Potts, R.; Vella, K.; Dale, A.; Sipe, N. Evaluating Governance Arrangements and Decision Making for Natural Resource Management Planning: An Empirical Application of the Governance Systems Analysis Framework. *Soc. Nat. Resour.* **2016**, *29*, 1325–1341. [[CrossRef](#)]
18. Nkhata, B.A.; Breen, C.; Hay, D.; Wilkinson, M. Property Rights, Institutional Regime Shifts and the Provision of Freshwater Ecosystem Services on the Pongola River Floodplain, South Africa. *Int. J. Commons* **2017**, *11*, 97–118. [[CrossRef](#)]
19. Le Tourneau, F.M.; Beaufort, B. Exploring the Boundaries between Individual and Collective Land Use Management in a CPR System: The PAE Chico Mendes (Acre, Brazil). *Int. J. Commons* **2017**, *11*, 70–96. [[CrossRef](#)]
20. Dietz, T.; Ostrom, E.; Stern, P.C. The Struggle to Govern the Commons. *Science* **2003**, *302*, 1907–1912. [[CrossRef](#)] [[PubMed](#)]

21. Ostrom, E.; Nagendra, H. Insights on Linking Forests, Trees, and People from the Air, on the Ground, and in the Laboratory. *Proc. Natl. Acad. Sci. USA* **2006**, *103*, 19224–19231. [[CrossRef](#)] [[PubMed](#)]
22. Ormsby, A. Analysis of Local Attitudes toward the Sacred Groves of Meghalaya and Karnataka, India. *Conserv. Soc.* **2013**, *11*, 187–197. [[CrossRef](#)]
23. Armitage, D. Adaptive Capacity and Community-Based Natural Resource Management. *Environ. Manag.* **2005**, *35*, 703–715. [[CrossRef](#)] [[PubMed](#)]
24. Frost, P.; Campbell, B.; Luckert, M.; Mutamba, M.; Mandondo, A.; Kozanayi, W. In Search of Improved Rural Livelihoods in Semi-Arid Regions through Local Management of Natural Resources: Lessons from Case Studies in Zimbabwe. *World Dev.* **2007**, *35*, 1961–1974. [[CrossRef](#)]
25. Brown, H.C.P.; Lassoie, J.P. Institutional Choice and Local Legitimacy in Community-Based Forest Management: Lessons from Cameroon. *Environ. Conserv.* **2010**, *37*, 261–269. [[CrossRef](#)]
26. Mukamuri, B.B.; Campbell, B.M.; Kowero, G. Local Organisations and Natural Resource Management in the Face of Economic Hardships: A Case Study from Zimbabwe. In *Policies and Governance Structures in Woodlands of Southern Africa*; Kowero, G., Campbell, B.M., Sumaila, U.R., Eds.; Center for International Forestry Research: Bogor, Indonesia, 2003; pp. 28–43.
27. Kayambazinthu, D.; Matose, F.; Kajembe, G.; Nemarundwe, N. Institutional Arrangements Governing Natural Resource Management of the Miombo Woodland. In *Policies and Governance Structures in Woodlands of Southern Africa*; Kowero, G., Campbell, B.M., Sumaila, U.R., Eds.; Center for International Forestry Research: Bogor, Indonesia, 2003; pp. 45–64.
28. Wilfred, P.; Madoffe, S.S.; Luoga, E.J. Roles of Institutions in Biodiversity Conservation in Northern Uluguru Mountains, Morogoro, Tanzania: The Villagers' Perspective. *Discov. Innov.* **2007**, *19*, 15–24.
29. Andrew, M.; Ainslie, A.; Shackleton, C. *Land Use and Livelihoods*; Evaluating Land and Agrarian Reform in South Africa Occasional Paper Series; 8; Institute for Poverty, Land and Agrarian Studies: Cape Town, South Africa, 2003.
30. Shackleton, C.M.; Stickler, M.M. Local Wood Demand, Land Cover Change and the State of Albany Thicket on an Urban Commonage in the Eastern Cape, South Africa. *Environ. Manag.* **2015**, *55*, 411–422.
31. Gladman, T.; Shackleton, S.; Blignaut, J. Local Institutions, Actors, and Natural Resource Governance in Kgalagadi Transfrontier Park and Surrounds, South Africa. *Land Use Policy* **2015**, *47*, 121–129.
32. Kirkland, T.; Hunter, L.M.; Twine, W. "The Bush Is No More": Insights on Institutional Change and Natural Resource Availability in Rural South Africa. *Soc. Nat. Resour.* **2007**, *20*, 337–350. [[CrossRef](#)] [[PubMed](#)]
33. Twine, W.C.; Moshe, D.; Siphugu, V. Harvesting of Communal Resources by "Outsiders" in Rural South Africa: A Case of Xenophobia or a Real Threat to Sustainability? *Int. J. Sustain. Dev. World Ecol.* **2003**, *10*, 263–274. [[CrossRef](#)]
34. Shackleton, C.M.; Shackleton, S.E. The Importance of Non-Timber Forest Products in Rural Livelihood Security and as Safety Nets: A Review of Evidence from South Africa. *S. Afr. J. Sci.* **2004**, *100*, 658–664.
35. Dovie, D.B.K.; Shackleton, C.M.; Witkowski, T.F. Direct-Use Values of Woodland Resources Consumed and Traded in a South African Village. *Int. J. Sustain. Dev. World Ecol.* **2002**, *9*, 269–283. [[CrossRef](#)]
36. Shackleton, C.M.; Shackleton, S.E. Direct Use Values of Savanna Resources Harvested from Communal Savannas in the Bushbuckridge Lowveld, South Africa. *J. Trop. For. Prod.* **2000**, *61*, 28–47.
37. Nott, M.; Thondhlana, G. Fuelwood Preferences, Use and Availability in the # Khomani San Resettlement Farms, Southern Kalahari, South Africa. *For. Trees Livelihoods* **2017**, *26*, 156–169.
38. Agrawal, A. Sustainable Governance of Common-Pool Resources: Context, Methods, and Politics. *Annu. Rev. Anthropol.* **2003**, *32*, 243–262. [[CrossRef](#)]
39. Von Maltitz, G.P.; Shackleton, S.E. Use and Management of Forests and Woodlands in South Africa: Stakeholders, Institutions and Processes from Past to Present. In *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice*; Lawes, M.J., Eeley, H.A.C., Shackleton, C.M., Geach, B.G.S., Eds.; University of KwaZulu-Natal Press: Scottsville, NY, USA, 2004; pp. 109–135.
40. Shackleton, C.M. *Assessment of the Livelihoods Importance of Forestry, Forests and Forest Products in South Africa*; Unpublished Report Developed for Department of Water Affairs and Forestry and DFID: Grahamstown, South Africa, 2004.

41. Shackleton, C.; Grundy, I.M.; Williams, A. Use of South Africa's Woodlands for Energy and Construction. In *Indigenous Forests and Woodlands in South Africa: Policy, People and Practice*; Lawes, M.J., Eeley, H.A.C., Shackleton, C.M., Geach, B.G., Eds.; University of KwaZulu-Natal Press: Scottsville, NY, USA, 2004; pp. 337–363.
42. Giannecchini, M.; Twine, W.; Vogel, C. Land-Cover Change and Human–environment Interactions in a Rural Cultural Landscape in South Africa. *Geogr. J.* **2007**, *173*, 26–42. [[CrossRef](#)]
43. Madubansi, M.; Shackleton, C.M. Changes in Fuelwood Use and Selection Following Electrification in the Bushbuckridge Lowveld, South Africa. *J. Environ. Manag.* **2007**, *83*, 416–426. [[CrossRef](#)] [[PubMed](#)]
44. Matsika, R.; Erasmus, B.F.N.; Twine, W.C.A. Tale of Two Villages: Assessing the Dynamics of Fuelwood Supply in Communal Landscapes in South Africa. *Environ. Conserv.* **2012**, *1*, 1–13. [[CrossRef](#)]
45. White, C.; Bank, L.; Jones, S. Restricted Electricity Use among Poor Urban Households. *Dev. S. Afr.* **1997**, *14*, 413–423. [[CrossRef](#)]
46. Shackleton, C.M.; Buiten, E.; Annecke, W.; Banks, D.; Bester, J.; Everson, T.; Fabricius, C.; Ham, C.; Kees, M.; Modise, M.; et al. Exploring the Options for Fuelwood Policies to Support Poverty Alleviation Policies: Evolving Dimensions in South Africa. *For. Trees Livelihoods* **2007**, *17*, 269–292. [[CrossRef](#)]
47. Twine, W.C.; Holdo, R.M. Fuelwood Sustainability Revisited: Integrating Size Structure and Resprouting into a Spatially Realistic Fuelshed Model. *J. Appl. Ecol.* **2016**, *53*, 1766–1776. [[CrossRef](#)]
48. Shackleton, C.M.; Guthrie, G.; Main, R. Estimating the Potential Role of Commercial over-Harvesting in Resource Viability: A Case Study of Five Useful Tree Species in South Africa. *Land Degrad. Dev.* **2005**, *16*, 273–286. [[CrossRef](#)]
49. Brouwer, I.D.; Hoorweg, J.C.; van Liere, M.J. When Households Run out of Fuel: Responses of Rural Households to Decreasing Fuelwood Availability, Ntcheu District, Malawi. *World Dev.* **1997**, *25*, 255–266. [[CrossRef](#)]
50. Cousins, T.; Pollard, S.; Toit, D. *Legislation in Relation to Land, Water and Natural Resource Governance in Communal Land in South Africa*; Working Report for the Craigieburn Wetlands Governance Project: Acornhoek, South Africa, 2007.
51. Thornton, R. Environment and Land in Bushbuckridge, South Africa. In *Human Rights and the Environment: Conflicts and Norms in a Globalizing World*; Zarsky, L., Ed.; Earthscan: London, UK, 2002; pp. 219–240.
52. Twine, W.C. Socio-Economic Transitions Influence Vegetation Change in the Communal Rangelands of the South African Lowveld. *Afr. J. Range Forage Sci.* **2005**, *22*, 93–99. [[CrossRef](#)]
53. King, B.H. Spaces of Change: Tribal Authorities in the Former KaNgwane Homeland, South Africa. *Area* **2005**, *37*, 64–72. [[CrossRef](#)]
54. Shackleton, C.; Griffin, N.J.; Banks, J.M.; Mavrandomis, J.M.; Shackleton, S.E. Community Structure and Species Composition along a Disturbed Gradient in a Communally Managed South African Savanna. *Vegetio* **1994**, *115*, 157–167.
55. Emanuel, P.L.; Shackleton, C.M.; Baxter, J.S. Modelling the Sustainable Harvest of *Sclerocarya Birrea* Subsp. Caffra Fruits in the South African Lowveld. *For. Ecol. Manag.* **2005**, *214*, 91–103. [[CrossRef](#)]
56. Shackleton, C.M. Comparison of Plant Diversity in Protected and Communal Lands in the Bushbuckridge Lowveld Savanna, South Africa. *Biol. Conserv.* **2000**, *94*, 273–285. [[CrossRef](#)]
57. Ifegbesan, A.; Pendlebury, S.; Annegarn, H. Forest People, Two Countries and One Continent: What Empirical Connections? *Int. Res. Geogr. Environ. Educ.* **2009**, *18*, 45–56. [[CrossRef](#)]
58. Bushbuckridge Local Municipality. *Integrated Development Plan 2014–2016: Final IDP Document*; Bushbuckridge Local Municipality: Bushbuckridge, South Africa, 2014; p. 228.
59. Kahn, K.; Collinson, M.A.; Gómez-Olivé, F.X.; Mokoena, O.; Twine, R.; Mee, P.; Afolabi, S.A.; Clark, B.D.; Kabudula, C.W.; Khosa, A.; et al. Profile: Agincourt Health and Socio-Demographic Surveillance System. *Int. J. Epidemiol.* **2012**, *41*, 988–1001. [[CrossRef](#)] [[PubMed](#)]
60. Kajembe, G.C.; Luoga, E.J.; Kijazi, M.S.; Mwaipopo, C.S. The Role of Traditional Institutions in the Conservation of Forest Resources in East Usambara, Tanzania. *Int. J. Sustain. Dev. World Ecol.* **2003**, *10*, 101–107. [[CrossRef](#)]
61. Clover, J.; Eriksen, S. The Effects of Land Tenure Change on Sustainability: Human Security and Environmental Change in Southern African Savannas. *Environ. Sci. Policy* **2009**, *12*, 53–70. [[CrossRef](#)]

62. Liu, J.; Dietz, T.; Carpenter, S.R.; Alberti, M.; Folke, C.; Moran, E.; Pell, A.N.; Deadman, P.; Kratz, T.; Lubchenco, J.; et al. Complexity of Coupled Human and Natural Systems. *Science* **2007**, *317*, 1513–1516. [[CrossRef](#)] [[PubMed](#)]
63. Vaske, J.J.; Absher, J.D.; Bright, A.D. Salient Value Similarity, Social Trust and Attitudes toward Wildland Fire Management Strategies. *Hum. Ecol. Rev.* **2007**, *14*, 223–232.
64. Stern, M.J. The Power of Trust: Toward a Theory of Local Opposition to Neighboring Protected Areas. *Soc. Nat. Resour.* **2008**, *21*, 859–875. [[CrossRef](#)]
65. Stern, M.J. Coercion, Voluntary Compliance and Protest: The Role of Trust and Legitimacy in Combating Local Opposition to Protected Areas. *Environ. Conserv.* **2008**, *35*, 200–210. [[CrossRef](#)]
66. Oyono, P.R. New Niches of Community Rights to Forests in Cameroon: Tenure Reform, Decentralization Category or Something Else? *Int. J. Soc. For.* **2009**, *2*, 1–23.
67. Jones, B.T.B. *Community Management of Natural Resources in Namibia*; Issue Paper No. 90; Earthscan: London, UK, 1999.
68. Luoga, E.J.; Witkowski, E.T.F.; Balkwill, K. Land Cover and Use Changes in Relation to the Institutional Framework and Tenure of Land and Resources in Eastern Tanzania Miombo Woodlands. *Environ. Dev. Sustain.* **2005**, *7*, 71–93. [[CrossRef](#)]
69. Nkhata, B.A.; Mosimane, A.; Downsborough, L.; Breen, C.; Roux, D.J. A Typology of Benefit Sharing Arrangements for the Governance of Social-Ecological Systems in Developing Countries. *Ecol. Soc.* **2012**, *17*, 293–303. [[CrossRef](#)]
70. De Castro, F. Local Politics of Floodplain Tenure in the Amazon. *Int. J. Commons* **2016**, *10*, 1–20.



© 2018 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).