ENVIRONMENTAL GOVERNANCE, AGENCY AND MULTI-ACTOR DYNAMICS IN SOUTHERN AFRICA

Menelisi Falayi

ORCID ID: https://orcid.org/0000-0001-5564-7379

A thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

Department of Environmental Science

Faculty of Science

Rhodes University

March 2022

Abstract

Natural resources have, since the beginning of time, played a central role in supporting human wellbeing. In southern Africa resource consumption has drastically increased over the past 50 years, resulting in biodiversity loss and land degradation. To reduce land degradation and biodiversity loss rates in the region, great emphasis has been placed on building effective governance structures that can deliver environmentally and socially sustainable outcomes. However, environmental governance continues to be a major challenge in the management and conservation of natural resources in the region. Thus, there is renewed scientific and policy interest in strengthening the capacity of governance systems. This thesis is timely; there is an increasing desire by policymakers and land users in the region to develop governance options that enhance multi-actor participation and collaboration.

Therefore, this thesis explores the dynamics that influence the capacity of natural resource governance systems in southern Africa, predominately in Machubeni, South Africa (chapters 3 and 4) and in State forests in Zimbabwe (chapter 5). To achieve this aim, four stand-alone manuscripts that answer the following questions are included:

1. How have governance challenges manifested in natural resource management between 2010 and 2020 in southern Africa?
2. How were the governance objectives and attributes applied per historical period and what were the influencing drivers?
    a. What key drivers influenced rangeland condition over time in Machubeni?
3. How have multi-actor ties changed since the external investment in landscape governance and management in Machubeni, South Africa?
4. What role has agency played in the effectiveness of co-management initiatives in southern Africa?

To answer the questions, I applied Bennett and Satterfield's practical framework for understanding the objectives, attributes and elements of governance and Archer's

morphogenetic framework. The study employed a mixed-methods approach which included a scoping review methodology (chapter 2), household surveys, historical records, life history interviews, focus group discussions (chapters 3 and 4), social network analysis (chapter 4) and secondary data analysis (chapter 5). Results from the scoping review (chapter 2) show that research on governance challenges has not increased since 2010. Results suggest that governance challenges related to the maintenance of system integrity and functioning, specifically lack of coordination, accountability, skills, and resources to define effective natural resource management, were the most reported in the literature.

Chapter 3 elucidates the importance of history in evaluating the application of governance objectives and rangeland condition in resource-poor areas. The results show that the residual impacts of the 'ghost of environmental history' still influence governance dynamics in Machubeni, South Africa. Furthermore, contemporary challenges are linked to history. Chapter 4 shows that transformative spaces enhance collaboration and knowledge sharing between land users, government, and researchers. Finally, chapter 5 employs the morphogenetic framework to assess how agency (the capacity of people and organisations to make choices and decisions about their lives) influenced the effectiveness of co-management initiatives in southern Africa. The results suggest that in attempts to shift governance towards greater effectiveness, more attention should be paid to building individual and group agency. Based on the results from the empirical chapters, the study identified three key focus areas that require more attention in order to build effective landscape governance and management in southern Africa:(i) acknowledging the role of historical legacies and context,(ii) building and developing agency, capacity and trust amongst actors and (iii) the development of sustainable landscape financing mechanisms that will enable governance systems to deliver socially and environmentally sustainable outcomes.

Keywords: agency; effective governance; environmental governance; environmental history; governance challenges; multi-actor; natural resource governance; natural resource management

Inthetho eshwankathelweyo

Ubutyebi bendalo buqhubekile budlala indima ebalulekileyo ekuxhaseni impilo-ntle yoluntu. Ngenxa yokubaluleka kobutyebi bendalo kubomi babantu, ukusetyenziswa kobutyebi kuye kwanda kakhulu kule minyaka eyi-50 idlulileyo, okubangela ulahleko lweentlobo-ntlobo yezityalo nezilwanyana eziphilayo kunye nokhukhuliseko komhlaba kumazantsi e-Afrika. Ukunciphisa ukhukhuliseko komhlaba kunye namazinga alahleko eentlobo-ntlobo zezityalo nezilwanyana eziphilayo kummandla, ugxininiso olukhulu luye lwabekwa ekwakhiweni kweziseko zolawulo ezisebenzayo ezinokuzisa iziphumo ezizinzileyo ngokwemeko yendalo nentlalo. Nangona kunjalo, ulawulo lwendalo lusaqhubeka lungumceli mngeni omkhulu kulawulo nolondolozo lobutyebi bendalo kulo mmandla. Ngoko ke, kukho umdla ohlaziyiweyo wenzululwazi nomgaqo-nkqubo ekomelezeni isakhono seenkqubo zolawulo. Le ithisisi ifike ngexesha kuba kukho umnqweno okhulayo kummandla ngabaqulunqi bomgaqo-nkqubo kunye nabasebenzisi bomhlaba ukuphuhlisa iinketho zolawulo eziphakamisa ukuthatha inxaxheba kwabantu abaninzi kunye nentsebenziswano.

Ke ngoko, le ithisisi iphonononga izinto eziphembelela isakhono seenkqubo zolawulo lobutyebi bendalo kumazantsi eAfrika, ikakhulu eMachubeni, eMzantsi Afrika (isahluko 3 no 4) nakumahlathi kaRhulumente eZimbabwe (isahluko 5). Ukuphumeza le njongo, kufakwe layo:

1. Ibonakaliswe njani imiceli mngeni yolawulo kulawulo lwendalo phakathi ko-2010 no 2020 kumazantsi eAfrika?
2. Zeziphi injongo zolawulo kunye neempawu ezisetyenzisiweyo ngokwexesha lembali?
    a. Zeziphi ezona zinto eziqhuba phambili eziphembelele ukusetyenziswa kweenjongo zolawulo kunye neempawu ngokuhamba kwexesha?
    b. Zeziphi iindlela ezibalulekileyo ezichaphazele ngayo iimeko zamadlelo ekuhambeni kwexesha?
3. Atshintshe njani amakhonkco obudlelwane phakathi kwabathathi-nxaxheba ukusukela oko kutyalo-mali lwangaphandle kulawulo lobume bomhlaba eMachubeni, eMzantsi Afrika?

4. Yiyiphi indima edlalwe sisakhono sokwenza ukhetho kunye nezigqibo malunga nobomi bakho ekusebenzeni ngempumelelo kwamalinge olawulo ngokubambisana kumazantsi e-Afrika?

Ukuphendula imibuzo, ndisebenzise isakhelo esisebenzayo sikaBennett kunye noSatterfield ukuqonda iinjongo kunye neempawu zolawulo kunye nesakhelo se-Archer's morphogenetic. Uphononongo lusebenzise iindlela ezixubeneyo ezibandakanya indlela yokuphononongа iincwadi zophando (isahluko 2), uphando lwamakhaya, iirekhodi zembali, udliwano-ndlebe lwembali yobomi, iingxoxo zeqela eligxininisiweyo (isahluko 3 kunye no 4), uhlalutyo lonxibelelwano nobudlelwane boluntu (isahluko 4) kunye nohlalutyo lwedatha ethathwe ngomnye umntu. (isahluko 5). Iziphumo ezivela kuphononongo lweencwadi zophando (isahluko 2) zibonakalisa ukuba uphando ngemiceli mngeni yolawulo alunyukanga ukusukela ngo-2010. Iziphumo zibonisa ukuba imiceli mngeni yolawulo enxulumene nokugcinwa kwemfezeko nokusebenza kwenkqubo, ngokukodwa ukungabikho kolungelelwaniso, uxanduva, izakhono, kunye nezibonelelo zokuchaza ulawulo lwemithombo yendalo olusebenzayo, yayiyeyona ichazwe kwiincwadi.

Isahluko sesi-3 sicacisa ukubaluleka kwembali ekuvavanyeni ukusetyenziswa kweenjongo zolawulo kunye nemeko yemihlaba ekwiindawo ezihlwempuzekileyo ngezibonelelo. Iziphumo zibonisa ukuba uchaphazeleko oshiyekileyo we-'ghost of environmental history' zisenefuthe kulawulo lwenguquko eMachubeni, eMzantsi Afrika. Ngaphezu koko, imiceli mngeni yangoku inxulunyaniswa nembali. Isahluko sesi-4 sibonisa ukuba iindawo eziguqulayo ziphucula intsebenziswano nokwabelana ngolwazi phakathi kwabasebenzisi bomhlaba, urhulumente nabaphandi. Ekugqibeleni, isahluko sesi-5 sisebenzisa isakhelo se-morphogenetic ukuvavanya indlela isakhono sabantu kunye nemibutho sokwenza ukhetho kunye nezigqibo malunga nobomi babo ibe nefuthe ekusebenzeni kwamanyathelo olawulo ngokubambisana kumazantsi e-Afrika. Iziphumo zibonisa ukuba kwiinzame zokutshintsha ulawulo ukuze lusebenze kangangoko, ingqwalasela engaphezulu kufuneka ibekwe ekwakheni isakhono, somntu neseqela, sokwenza ukhetho kunye nezigqibo malunga nobomi babo. Ngokusekelwe kwiziphumo ezivela kwizahluko zobungqina, uphononongo luchonge imiba emithathu engundoqo ekugxilwe kuzo ezifuna ingqwalaselo ethe kratya ukuze kwakhiwe ulawulo lwemihlaba olusebenzayo kumazantsi e-Afrika. Ngokukodwa: (i) ukuqaphela indima yelifa lembali kunye nomxholo (ii) ukwakha nokuphuhlisa isakhono

sokwenza ukhetho kunye nezigqibo malunga nobomi, isakhono kunye nokuthembana phakathi kwabathathi-nxaxheba kunye (iii) nokuphuhliswa kweendlela ezizinzileyo zenkxaso-mali yendawo eziya kwenza ukuba iinkqubo zolawulo zinike iziphumo ezizinzileyo ngokwentlalo nendalo.

Declaration

I, Menelisi Falayi, hereby declare that this thesis is my original work, and that all the sources consulted have been duly acknowledged within the text and list of references. The thesis is submitted in fulfilment of the requirements for the degree of Doctor of Philosophy at Rhodes University, and has not been submitted for any degree nor examination at any other university.

Signature:  Date: 14 March 2022

Dedication

To my late sister, Sithembile Falayi, this is for you and thank you bud! ☺

Acknowledgements

My PhD journey has been an endeavour that included many people from different parts of the world. I would like to thank all of you for making this journey memorable.

Firstly, I want to acknowledge my supervisors: Prof. James Gambiza and Prof. Michael L. Schoon. This journey could not have been a success without your excellent academic guidance and caring support whenever I felt disheartened. I am proud to consider both of you as my role models and mentors for life. To Prof. James Gambiza, I would like to specifically thank you for providing this exciting opportunity and the intellectual freedom to carry out my PhD under the UNDP-GEF5 SLM project. To Mike, thank you for delivering wisdom on environmental governance concepts.

Beyond my two supervisors, I was fortunate to work with many knowledgeable thinkers. Thank you to Georgina Cundill-Kemp, Anthony R. Palmer, Lawrence Sisitka, Graeme S. Cumming, David H.M. Cumming and Carolyn Gay Palmer for providing important insights into the role of agency in my studies. I am extremely thankful to Prof. Gladman Thondhlana, Dr J Cockburn, Miranda Bennet and Nonceba Bhebhe for shaping and providing intellectual support for chapter 2. Without your help, it would have been difficult to carry out a scoping review successfully. I would also like to acknowledge the support I received from the UNDP-GEF5 Eastern Cape team: Charles Chakoma, Monde Duma, Idah Mbengo, Sisipho Myoyo, Karen Milne, Silindile Sibiya, Mdoda Ngwenya, Buhle Francis and Ojong Enokenwao. Without your support, I would not have managed to collect data for my project so extensively.

A very special thank you to the practitioner partners who agreed to participate in my work as a case study: chapters 3 and 4. Thank you for sharing your knowledge about the Machubeni landscape and for building a successful multi-stakeholder forum. To Mr Mbete and Lusanda Mtyotywa, thank you for helping me with organising the multi-actor forums. To Mr Mbete, thank you for your wisdom on how to collaborate and engage with different government departments. This research would not have been possible without the generous participation and contributions of the households in Machubeni villages. I am indebted to Mrs Xoliswa Mjuleni for assisting me during my fieldwork and introducing me to the Machubeni

community. Furthermore, I would like to extend my sincerest gratitude to the 130 people who participated in the governance survey. To the Malithi family, thank you for providing safe and secure accommodation while I was conducting my fieldwork.

I would like to thank the Department of Environmental Science at Rhodes University for hosting me during my PhD. Thank you, Dr Sheunesu Ruwanza (Postgraduate coordinator), for keeping my postgraduate workload within reasonable limits. Your support was instrumental. To Karen Milne, thank you for managing my research account and for helping me in planning fieldwork logistics. Without you, I would not have been able to go on many field trips. Furthermore I would like to thank Nonceba Bhbehe and Christine Stewart for editing my thesis.

I wish to thank my sisters, Thenjiwe Takaendisa and Sukholuhle Falayi, for their unwavering support during my stay in South Africa. To my brothers, Thandanani Falayi, Dr Thabo Falayi and Dr Mbusi Falayi, I am deeply indebted for your love, support and encouragement. To my friends Nonceba Bhebhe, Lovejoy Mpamba, Tariro Muroyi, Nkosinomusa Nyoni, Florah van Heerden, Johannie Bvute, Elder Magadza, Chishimba Kasanga, Amanda Nyamambi-Nyathi, Amanda Manyani, Glen Vembo, Edward Mhlongo, Stacie Matshaze, Uviwe Bolosha, Afika Njwaxu and Dr Current Masunungure, I thank you for your encouragement and support throughout this journey. To Dr David Gwapedza, thank you for encouraging me and helping me to reach my goals. Most importantly, I am grateful to my mum, Vaida Falayi. Mum, I am so thankful for your avid interest in my study and your financial support in giving me an education that will benefit me for the rest of my life, "*emaphosandlela Yami*". Lastly, I would like to thank God for giving me this once in a lifetime opportunity to undertake and successfully complete the PhD journey.

This research was made possible by the UNDP-GEF5 Sustainable Land Management Project through Rhodes University (Project ID: 00095288). Furthermore, I would like to acknowledge the Oppenheimer Memorial Trust (OMT REF: 21250/01) for providing additional financial assistance.

Table of Contents

List of figures

List of Tables

Chapter 1: Introduction

1.1 Background

Research shows that natural resources play a central role in supporting human wellbeing (Millennium Ecosystem Assessment 2005, Barnes and Child 2014, Shereni and Saarinen 2021). In particular, humans gather food, fuel, building material, water, soils, minerals and medicines from natural resources for their subsistence and livelihoods (Thondhlana and Muchapondwa 2014, Falayi et al. 2019). In some cases, humans get their spiritual nourishment from natural resources (Fabricius et al. 2004). For this thesis, natural resources cover forestries, fisheries and 'everyday' resources such as bees, water and fuelwood (Fabricius et al. 2004). Given the importance of natural resources as a key asset for driving social and economic development, resource use has increased over the past fifty years (Steffen et al. 2015). Scientists call this period 'the great acceleration' because resource exploitation has exceeded natural regeneration rates (McNeill 2016).

Since the 1970s natural resource use has tripled due to population growth, and industrial and technological development (Steffen et al. 2015). In a review of earth system indicators by Steffen et al. (2015), urban population, fertilizer consumption and water use have exponentially increased since the 1950s within BRICS countries. Here BRICS refers to Brazil, Russia, India, China and South Africa. The increased exploitation of natural resources within emerging countries (BRICS) may have long-lasting consequences for future ecosystem services (Steffen et al. 2015). For example, overexploitation may negatively affect the provision of food, medicines and timber. Such exploitation may negatively impact the coping capacity and erode people's livelihoods (Shackleton and Luckert 2015).

The Intergovernmental science-policy Platform on Biodiversity and Ecosystem (IPBES) has revealed that the loss of natural resources has reached high levels around the globe (Scholes et al. 2018). Notably, the overexploitation of natural resources has led to fishery collapses, land degradation, and deforestation (Zemp et al. 2017, Scholes et al. 2018, Ferguson-Cradler 2018). Scientists suggest that continued exploitation may leave the ecosystems degraded for decades to come (Folke et al. 2004, Archer et al. 2018) or

permanently degraded (Barnosky et al. 2012). Despite the increased calls for sustainable harvesting, management and governance of natural resources since the Stockholm Declaration in 1972, fostering effective governance remains a key challenge in southern Africa (Falayi et al. 2021). Environmental governance or natural resource governance refers to the ordering of relationships between people and groups of people through institutions, structures and processes (Ostrom 1994).

Studies from southern Africa show that governance systems face many challenges occurring at multiple scales (e.g. Schoon 2013, Chinangwa et al. 2016, Adams et al. 2018, Makaya et al. 2020). Challenges relating to lack of resources, accountability, and coordination, absence of political support, and conflicts between actors, which inhibit the successful implementation of management plans, have been widely reported (Falayi et al. 2021). In some areas within southern Africa, the inability of governance systems to deliver environmentally and socially sustainable outcomes has led to land degradation - in Machubeni (Shackleton and Gambiza 2008) and deforestation - in Zimbabwe (Mutekwa and Gambiza 2016).

To seek insight into the aforementioned governance challenges, this research project and dissertation explores the dynamics that influence the capacity of natural resource governance systems in southern Africa. In the following sections, I will highlight the gaps in understanding governance dynamics in southern Africa, key questions and objectives, conceptual framing and the structure of the thesis.

1.1.1 Problem statement and gaps in understanding governance dynamics in southern Africa

From the preceding, natural resources play a pivotal role for human well-being. Given the ongoing and increasing degradation of natural resources in Africa (Archer et al. 2018), interest in developing policies that lead to effective governance has increased over the past two decades (Fabricius et al. 2004, Child and Barnes 2010). Despite this, localised studies show that natural resource governance challenges outnumber conservation successes within southern Africa (e.g. Child and Barnes 2010, Mutekwa and Gambiza 2017). This suggests that governance systems in southern Africa are unable to achieve environmentally and socially

sustainable outcomes (*refer to chapter 2*). Despite an increase in the number of localised studies in southern Africa that identify governance challenges inhibiting effective natural resource management (Nkhata and Breen 2010, Adams et al. 2018, Makaya et al. 2020), I argue that such studies only offer site-specific insights. Although localised case studies are important in identifying governance challenges inhibiting effective natural resource management, they are unable to provide trends in governance challenges across multiple systems (Potts 2020). Therefore, more insights are needed into where greater support is required in order to improve the capacity, functioning and performance of governance systems in southern Africa (*refer to chapter 2*).

Learning from history is important because it enables us to understand how humans have caused, reacted and attempted to deal, with environmental challenges (Hughes 2016). This understanding is critical in developing effective governance reforms in postcolonial territories like southern Africa, because colonialism left a long-lasting legacy of marginalisation and disempowerment. It is from this notion that I use the term 'the ghost' of environmental history because current governance arrangements are directly connected to the past (*refer to chapter 3*). Despite the well-known effects of colonialism and apartheid on environmental governance, few localised studies have analysed the factors influencing governance arrangements and natural resource conditions over time in southern Africa (e.g. Mutekwa and Gambiza 2016). Therefore, greater attention needs to be paid to understanding the influences of history on governance arrangements and natural resource conditions over time (*refer to chapter 3*). Such understanding is crucial in developing meaningful reforms and collaboration (Falayi et al. 2022).

Calls for widening the net for multi-actor engagement and participation have gained traction in Africa over the past decades (Favretto et al. 2021). Multi-actor engagement and participation are largely viewed as a key ingredient for achieving environmentally and socially sustainable outcomes in Africa, but at the same time, it is reported to be challenging to implement (Favretto et al. 2021). While 'new' tools and approaches, such as the 'gardening tools' (Cockburn et al. 2020) and transformative spaces (Pereira et al. 2018), have been developed to help navigate multi-actor complexities, meaningful collaboration is reported to

be challenging. This calls for critical assessments that track how collaborative ties change over time (*refer to chapter 4*). This understanding is crucial in identifying barriers and enablers that enable or disable effective environmental governance (*refer to chapter 4*).

Effective environmental governance is a fundamental component of social-ecological sustainability (Bennett and Satterfield 2018). To be effective requires the establishment of responsive and robust governance systems. This involves appropriate relationships between institutions (rules and norms), structures (formal and informal networks), and processes (policy and decision-making). Within the rich discourse concerning the interactive role of institutions, structures, and processes, I contend that inadequate attention has been paid to the importance of agency: the capacity of people and organisations to make choices and decisions about their lives (Archer 1995). It is therefore critical to explore the role of agency in natural resource governance (*refer to chapter 5*).

1.2 Research objective and key questions

In working towards filling the aforementioned research gaps, this PhD thesis explores the dynamics that influence the capacity of natural resource governance systems in southern Africa. To achieve this aim, the broad research objectives and related questions were as follows:

1. To assess how governance challenges have manifested in natural resource management during 2010-2020 in southern Africa.

    a. How have governance challenges manifested in natural resource management between 2010 and 2020 in southern Africa?

2. To identify drivers influencing governance dynamics and rangeland condition in Machubeni, South Africa.

    a. How were the governance objectives and attributes applied per historical period, and what were the influencing drivers?

b. What key drivers influenced rangeland condition over time in Machubeni?

3. To examine the changing dynamics of multi-actor and multi-level actor ties over a period of two years in Machubeni, South Africa.

   a. How have multi-actor ties changed since the external investment in landscape governance and management in Machubeni, South Africa?

4. To explore the relevance of agency for the effectiveness of environmental governance.

   a. What role has agency played in the effectiveness of co-management initiatives in southern Africa?

From the current theoretical literature, the following propositions can be drawn, which underlie this research

I. Governance challenges limit the capacity for natural resource systems to deliver environmentally and socially sustainable outcomes.

II. Rangeland resource degradation is driven by casual factor synergies, of which the most prominent is poor governance.

III. Governance fractures inhibit the development of individual and collective agency.

1.3 Framing the research: theoretical approach

To answer the overarching questions of this research (*refer to chapter 1, section 1.2*), the study drew from different literatures and conceptual frameworks on environmental governance and agency. This study largely draws on the practical framework for evaluating the objectives, attributes and elements of environmental governance (Bennett and Satterfield

2018), the morphostatic/morphogenetic (M/M) framework (Archer 1995) and the social-ecological systems framework (Ostrom 2009).

1.3.1 The concept of environmental governance through the lenses of Bennett and Satterfield (2018)

Environmental governance or natural resource governance refers to the ordering of relationships between people and groups of people through institutions, structures and processes (Ostrom 1994). Governance involves people or groups of people who are generally referred to as actors. Actors involved in the governance of natural resources usually vary depending on the scale under discussion (Keohane and Ostrom 1994). These scales include micro-, meso-, and macro-level (Child and Barnes 2010, Barnes and Child 2014). For example, at a micro-scale actors may include natural resource user groups, cooperatives, headmen, chiefs, local politicians (councillors) and religious leaders (Cundill and Fabricius 2010, Cockburn et al. 2019).

At a meso- and macro- scale, actors may include multi-national corporations, international donors and lobbyists (Barnes and Child 2014). These scales of multi-actor partnerships create a complex realm of power struggles (Ostrom et al. 1994, Dietz et al. 2003, Congleton 2007, Cundill and Fabricius 2010, Mutekwa and Gambiza 2017). Therefore to comprehend the concept of governance, one must understand how decisions are made and whether laws, rules or policies lead to sustainable outcomes (Bennett and Satterfield 2018). Figure 1.1 shows the key elements, objectives and attributes of environmental governance.

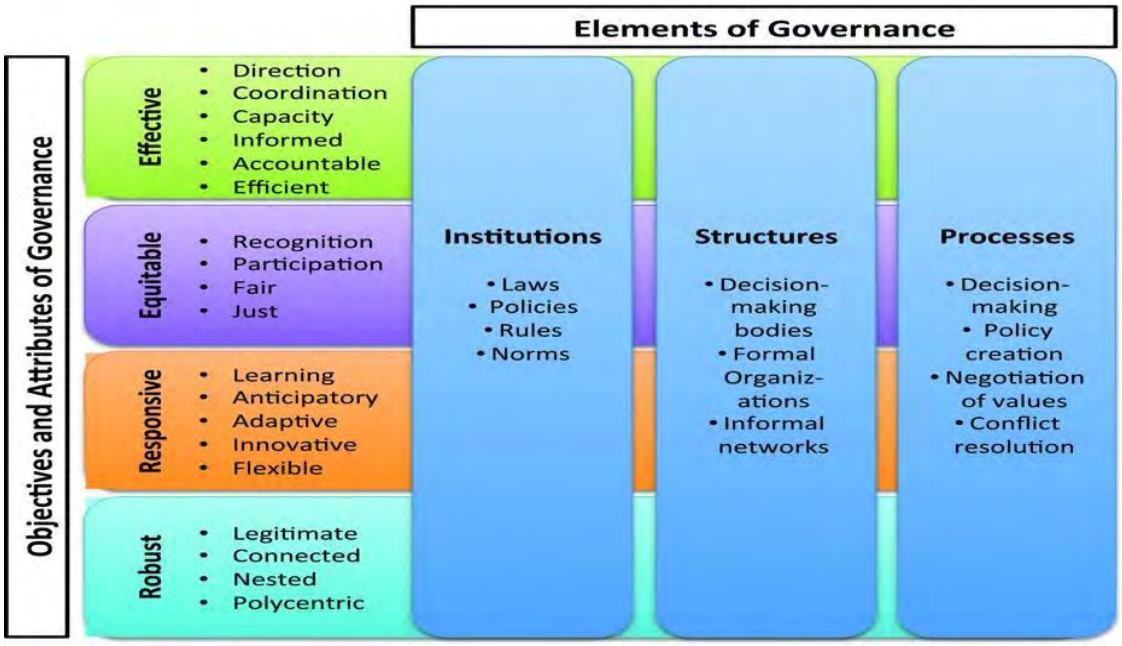


Figure 1.1 A practical framework for evaluating the objectives, attributes and elements of environmental governance, adapted from Bennett and Satterfield (2018)

Reflecting on my definition above, social coordination in governance systems occurs through one or multiple interactions (Bodin 2017). Practice has shown that the governance of natural resources involves numerous institutions coexisting and interacting across scales (Bennett 2013, Kuster et al. 2020). *Institutions* involved in natural resource governance are usually divided into two categories: 'informal' and 'formal'. Institutions are defined as laws, rules, norms and customs that shape human-environment interactions (North 1990). In other words, institutions act as intermediaries between actors and resources in that they either enable or constrain management decisions (Cumming et al. 2020). Chapter 3 will show how different actors inhibit or enable multi-actor collaboration. Drawing from the work by McGinnis and Ostrom (2014), institutions are arranged in three layers of 'rules-in-use': operational choice, collective choice and constitutional choice. Operational choice rules are the day-to-day rules that directly affect or determine the actions or activities taken by different actors in a system.

In contrast, collective choice rules determine how operational rules are established. Here collective choice rules determine which institutional actors get to make the rules and how the rules are set and changed (Ostrom et al. 1994). Both the operational and collective

choice rules are, in turn, formulated under the constitutional choice rule conditions (Carlsson and Berkes 2005). Here constitutional choice rules determine which institutional actors participate in the system (decision-making), how actors are selected, and what powers and authority one can exercise (Ostrom et al. 1994). The concept of rules-in-use highlights the importance of hierarchical structures and multi-actor interaction in rulemaking and resource sharing (Ostrom 2010a).

The term *structures* refers to in/formal composition, spatial pattern, and connections between different multilevel organisations (power relations, decision-making, and co-management bodies) (Cumming et al. 2020). For example, structures may include co-management bodies, private organisations, civil organisations and government departments (*refer to chapters 3, 4 and 5*). These entities are regarded as important in determining whether resultant policies lead to environmentally and socially sustainable outcomes. Therefore, their (entities) *function* becomes important in determining broader system dynamics in natural resource governance. According to Cumming et al. (2020), function may be either purposive, unintentional or subverted. Purposive function occurs when a "system has been designed to achieve a given function" (Cumming et al. 2020 p. 27) while unintentional function occurs inadvertently. A subversion occurs when a "rule that has been introduced for one purpose is co-opted to support another purpose". For example, Clapham (2017) noted that Japan has continued to subvert Article VIII of the International Convention for the regulation of whaling since 1986. The articles allow countries to undertake whaling for research purposes; however, Japan undertakes whaling for commercialisation. Such institutional functions play an important role in determining governance processes. Here governance *processes* (negotiation, learning and decision-making) refers to the interactions among actors, institutions and the natural environment. These interactions among system components usually play an important role in influencing the performance and outcomes of environmental governance (*refer to chapters 2, 3, 4 and 5*). Governance research suggests that these *outcomes* are usually influenced by the spatial and temporal dimensions of the study system (*context*). These dimensions include the biophysical (geography) and social (power relations) components that interact across scales to affect the capacity, performance and outcomes of governance.

1.3.2 Governance objectives and attributes

Bennett and Satterfield (2018) identified four generalised and distinct objectives and attributes (Figure 1.1). These distinct objectives include to be (a) effective, (b) equitable, (c) responsive, and (d) robust. This framing enabled my study to capture the 'entirety' of governance dynamics at play (*refer to chapters 2, 3 and 5*). In the next section, I define the four governance objectives (Figure 1.1).

1.3.3 Effective environmental governance

The first objective, effective governance, highlights the importance of "improving the ability of environmental systems to function and to produce ecosystem services through the persistence of species, habitats or biodiversity" (Bennett and Satterfield 2018 p. 7). The attributes of environmental governance include direction, coordination and capacity, and being informed, accountable and efficient (Figure 1.1). According to Bennett and Satterfield (2018), having a clear *direction* is important in achieving environmentally and socially sustainable outcomes. Here, clear direction is provided through the precise articulation of management plans (goals, vision and aim). The clear articulation of management plans helps to enable effective *coordination* of roles, functions and mandates of different actors. Thus, coordination is more commonly achieved through multi-scale actors (Falayi et al. 2020) and therefore requires *capacity* development (Cundill and Fabricius 2008). An example includes the Machubeni case in South Africa, where Cundill and Fabricius (2008) highlight that skills training of community-led institutions enabled effective coordination of management plans because actors were *informed* by the best available knowledge (scientific and indigenous). Williams et al. (2020) stress that bringing together different types of knowledge can promote inclusive and holistic management plans. Here, inclusive management plans provide mechanisms to hold actors *accountable* (Lockwood et al. 2010). Apart from accountability, Bennett and Satterfield (2018) suggest that efficacy is important in improving the ability of governance systems to deliver desired outcomes. *Efficient* governance requires "reasonable time requirements, that efficacy guides the choice of management actions and deployment of public resources, and that costs and actions are commensurate with system productivity" (Bennett and Satterfield 2018 p. 7).

1.3.4 Equitable environmental governance

The second objective, equitable environmental governance, underscores the importance of engaging with multiple decision-making processes to produce socio-economic outcomes of recognition, and participation, and that are fair and just (Bennett and Satterfield 2018). Equitable environmental governance requires inclusive *recognition* of people's values, knowledge systems, culture and rights. Most importantly, equitable environmental governance recognises the need for inclusive *participation* of varied multi-scale actors to enable effective collaboration (*refer to chapter 3*). Numerous governance studies in southern Africa highlight that inclusive participation is important for multi-actor collaboration, knowledge-sharing, and trust-building. Such participation requires processes and structures that enable the inclusion of multi-scale actors (Reed 2008, Lockwood et al. 2010), to ensure that benefits and burdens of environmental management are distributed in a *fair* manner. Furthermore, socially equitable environmental governance can be achieved by developing *just* laws and policies that protect the rights of indigenous people. This is a pertinent issue in southern Africa as indigenous groups lost their tenure due to the impacts of apartheid and colonialism (*refer to chapters 2 and 3*).

1.3.5 Responsive environmental governance

The third objective, responsive governance, draws attention to governance systems that are adaptable to changing socio-ecological conditions (Bennett and Satterfield 2018). The attributes of responsive environmental governance include learning, adaptability, innovation, flexibility and anticipation (Figure 1.1). To adapt to changing socio-ecological conditions, social *learning* is required. Here social learning is defined as the collective action and reflection that takes place amongst actors when they work to improve the socio-ecological performance of natural resource management systems (Reed et al. 2010). Furthermore, the process of social learning is regarded as important in environmental governance because it pays attention to how *innovation* takes place (Keen et al. 2005). A culture of innovation is important because it enables actors to experiment with new ideas (*refer to chapter 3*). Experimenting with new ideas is key because it allows actors across scales to monitor and

document the successes and failures that enable or disable effective collaboration. Furthermore the knowledge to address disturbances can be improved through the institutionalisation of *anticipation* and this includes risk planning (see Tschakert and Dietrich 2010, Boyd et al. 2015). Anticipating short and long term risks in governance is important because it enables actors to calibrate management models (Boyd et al. 2015). Another key attribute of responsive environmental governance is *adaptability*. Adaptive governance largely refers to multiple governance mechanisms that include actors, organisations, networks and institutions that seek to address societal needs and desires to mitigate and adapt to changing conditions (Walker et al. 2004, Chaffin et al. 2014, Schultz et al. 2015). Adaptive governance is suggested to be a critical approach in understanding, managing and governing complex social-ecological systems (Folke et al. 2005, Schultz et al. 2015). Given the uncertainties related to global environmental change, several scholars suggest that, going forward, environmental governance systems must be highly adaptive (Fabricius and Cundill 2010, Chaffin et al. 2014, Scholes et al. 2018) and *flexible* (Epstein et al. 2015). This requires reflection and adjustments of governance management plans to match the fast-changing social-ecological contexts in which interventions are implemented (Bennett and Satterfield 2018).

1.3.6 Robust environmental governance

Finally, the fourth objective is to be robust. The attributes of robust environmental governance are legitimacy, connectedness, nestedness and polycentricity (Bennett and Satterfield 2018). *Polycentricity* is a crucial component of robust adaptive governance. Polycentricity is a governance system involving multiple organisational units that operate autonomously (McGinnis and Ostrom 2012). In other words, these autonomous decision-making units interact with each other within and across nested scales to achieve a balance of collaboration and autonomy (Schoon et al. 2015). The *nested* configurations mean that decision-making capabilities exist in different scales or levels of administrative jurisdictions (Carlisle and Gruby 2019). This provides opportunities to represent various organisational units drawn from the public, private and voluntary sectors (McGinnis and Ostrom 2012). The key point is that different problems at different scales require different institutions and governance structures that are *legitimate*, in order to guide collective action (Bruns 2019).

This ensures that institutions and actors are *connected* horizontally and vertically. This approach combines the need for functional redundancy in promoting resilience, with the capacity for experimentation and learning between loosely connected governance authorities at any given level and between levels (Ostrom 2010b). In the case of failure and collapse, such an interconnected system also facilitates institutional memory and the emergence of new institutional structures.

1.3.7 Morphostatic/morphogenetic (M/M) framework

The Morphostatic/morphogenetic (M/M) framework provided a useful heuristic for analysing the role that agency has played in the effectiveness of co-management initiatives in southern Africa (*refer to chapter 5*). The M/M is primarily associated with Archer (1995). The framework describes the cyclical process of social change (Archer 1995). Archer utilises the framework to explore emergent properties of systems (social structure, culture and peoples) (Figure 1.2).

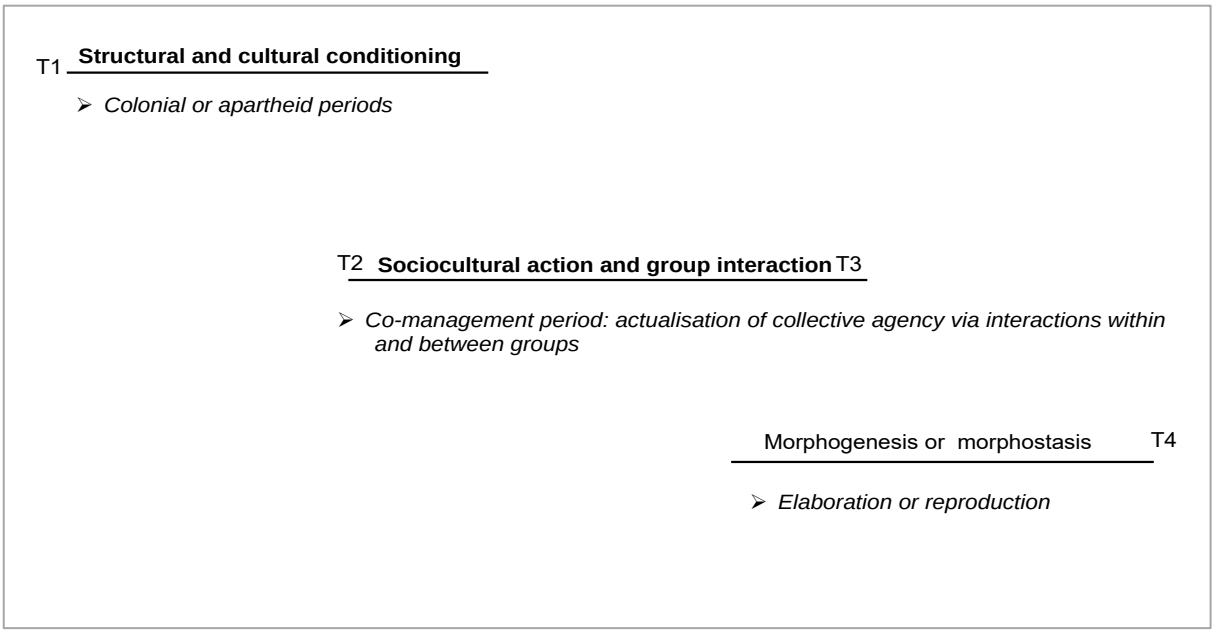


Figure 1.2 The double morphostatic/morphogenetic (M/M) cycle illustrating the emergence of agency in natural resource governance, adapted from Archer (1995)

Archer suggests that the emergent properties of systems (social structure, culture and peoples) independently interact to produce a state of change (morphogenesis) or a state of no change (morphostasis). Using Archer's lenses, I argue that agency interplays with structure

(governance) and culture (beliefs and values) to result in either morphogenesis or morphostasis (*refer to chapter 5*). The M/M cycle is divided into three parts: at time T1, actors (agents) are shaped by structural and cultural conditions. In this thesis, these conditions are the historical factors such as apartheid or colonialism (Figure 1.2). At time T2-T3 it is the period when actors are engaged in co-management initiatives. Time T3-T4 shows the structural elaboration (morphogenesis) or reproduction (morphostasis). This time period highlights the consequences of the interactions during the co-management periods. Of particular interest in this study is the exploration of the role played by the agency of natural resource user groups at the community level, in determining the effectiveness of co-management (*refer to chapter 5*). The socio-ecological systems theory (Ostrom, 2009) and systems thinking (Holling and Gunderson, 2002) was used to explore inter-relationships (context, connections), perspectives (each actor has their own unique perception of the situation) and boundaries (agreeing on the scope, scale and what might constitute improvement). I linked the SESs theory with the Systems theory because the SESs theory goes further in linking dynamics of environmental change (land degradation) and societal change.

1.4 The research process

1.4.1 My personal journey

I enrolled for my PhD studies in August 2018 after being awarded the GEF5-UNDP scholarship. As part of the GEF5-UNDP project being implemented in South Africa, I had to work as a governance consultant and also as a student. My work as a consultant inspired me to explore the dynamics that influence the capacity of natural resource governance systems in southern Africa. To fully understand governance challenges limiting the successful management of natural resources, I conducted a scoping review (*refer to chapter 2*). Some parts of the scoping study are presented in this chapter. While conducting the scoping review, I continued working with the different actors in Machubeni, South Africa. My interaction with different actors inspired the GEF5-UNDP team to establish a multi-actor forum, which is named Masibambisane. Masibambisane is an isiXhosa word, meaning *let us work together*. This work led to me being awarded the prestigious 2019 Rhodes University Student Researcher of the Year Award. My interactions with different actors across scales enabled me to gather data and write chapters 3, 4 and 5. While analysing my data, I realised that one of

the key challenges was the issue of agency. It is from this realisation that I approached my two advisors on how to conceptualise and analyse agency. My advisors helped me to assemble a group of experts on natural resource governance. These experts assisted me in developing my ideas on the concept of agency (*refer to chapter 5*). I have been privileged to present the results from my thesis at two international online conferences - IASC African Commons 2020 (chapter 4) and IASC Land Commons 2021 (chapter 5). Furthermore I was invited as a guest speaker by the ARUA-CD Climate Resilient African Landscapes to present findings from my thesis and to assist in co-developing a short course aimed at enabling multi-actor engagement for landscape management in Africa.

1.4.1 Brief overview of the methodological approach

Given the interdisciplinary nature of this research, different methods will be drawn from different disciplines to investigate the dynamics that influence the capacity of natural resource governance systems in southern Africa. An interdisciplinary approach is essential in providing a holistic interpretation of the system investigated (Klein 2004). Combining qualitative and quantitative methods is important for understanding complex social-ecological systems. For this thesis, a mixed-method approach was employed to understand the dynamics of environmental governance in southern Africa. A mixed-methods approach combines the elements of quantitative and qualitative data (Creswell 2014). This approach is important because it provides nuanced exposition under study. My research used a scoping review technique, in-depth household surveys, participatory workshops and semi-structured interviews (refer to chapters 2,3,4 and 5). The integration of both quantitative and qualitative data promoted the validity of my results (Creswell 2014).

Creswell (2014) identified several typologies of mixed-method research designs. The most common typologies used in sustainability sciences and environmental sciences are a) convergent parallel b) explanatory sequential and exploratory sequential mixed methods design. For this study, I used the convergent-parallel approach. A convergent parallel design entailed the concurrent collection of qualitative and quantitative data during the same phase of a research process (Creswell and Clark 2011).

1.4.2 Ethical considerations and approvals

Since this research involved numerous actors across scales, it was important to adhere to a system of recognized moral principles (Hallowell et al. 2004, Ransome 2013). Here, ethics are rules of conduct that actors adopt when they act within social contexts (Ransome 2013). This thesis was conducted in accordance with Rhodes University Ethical Standards-Human ethics. Ethical research clearance (see Appendix 1) was obtained from the Rhodes University Ethical Standards Committee (Code: 2019-0658-813), and both written and verbal consent was sought. Two-thirds of the actors opted for verbal consent because participants were not comfortable with written documents. The following key aspects were adhered to throughout the research:

- Approval: The researcher requested approval from relevant government departments, local chiefs, and headmen before the commencement of the study.

- **Consent forms**: Consent forms were presented and read out to all participants before the commencement of the research. Consent forms included the project aims, objectives and methods.

- **Confidentiality and Anonymity**: The researcher guaranteed the confidentiality of the information given to him. All views and perceptions of every participant were recorded as accurate. To ensure anonymity, the respondents were kept unidentified, and pseudonyms were generated.

- **Researcher feedback**: Respondents were given feedback and research findings during multi-actor forums. Two policy briefs and information sheets were provided to government officials as part of the results feedback.

1.4.3 Structure of the thesis

The thesis is based on four research/data chapters (*refer to chapters 2, 3, 4 and 5*). This thesis was structured in a paper-based format to facilitate the publication of this research. Each research/data chapter constitutes a publication. All four chapters have been submitted to peer-reviewed international scientific journals (see Figure 1.3). Chapters 2 and

4 have been published, while chapters 3 and 5 are under review. Specifically, chapter 3 is in the second round of the peer-review process, and chapter 5 is in the third round of the peer review process (Figure 1.3). Each chapter employs one or more different conceptual framing methods to answer one or more research questions as summarised below:

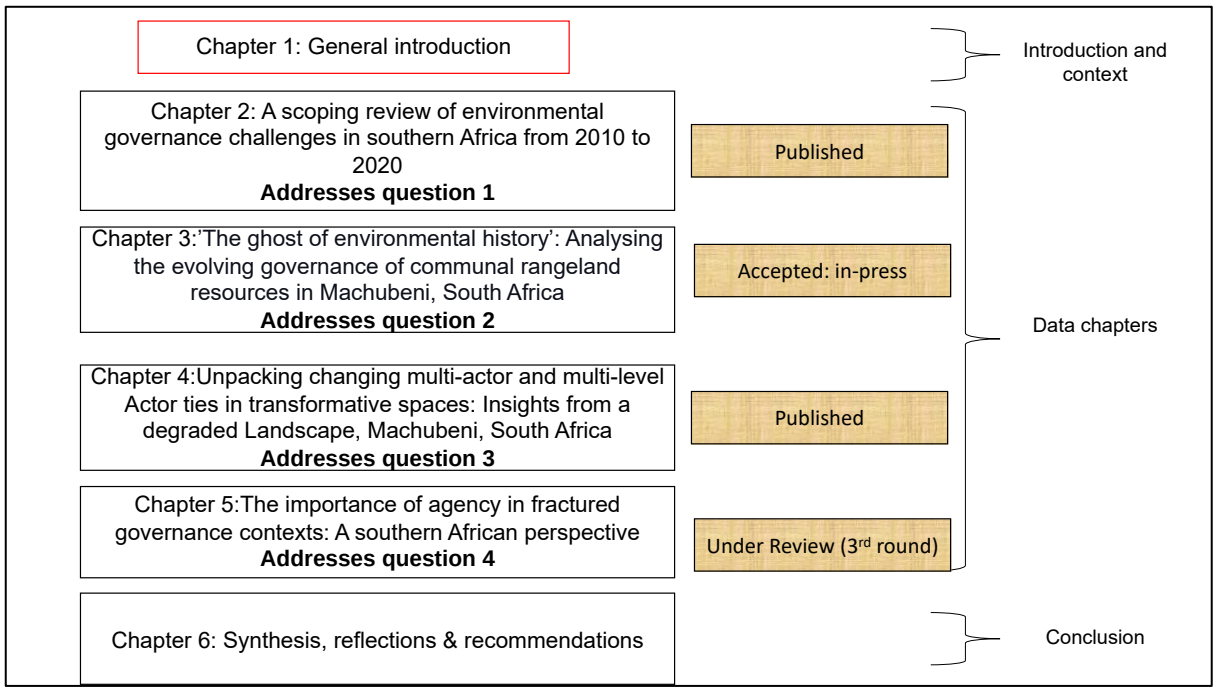


Figure 1.3 Structure of the thesis

Chapter 1: Introduction outlines the general study. In this chapter, I introduce the reader to the theoretical framing and applied context for this PhD. Here I give a general overview of the concepts on environmental governance, institutions, structures and processes.

Chapter 2: A scoping review of environmental governance challenges in southern Africa from 2010 to 2020. This chapter provides a baseline of the existing governance challenges in southern Africa. The chapter is equivalent to a traditional review. The scoping review contributes to a body of literature and discussions around natural resource governance and management in southern Africa. This chapter shows that more than half of the governance challenges were related to effectiveness (maintenance of system integrity and functioning), followed by challenges related to equitability, robustness and

responsiveness. This chapter concludes that greater emphasis should be placed on reforming tenure systems, enabling sustainable financing, genuine devolution and effective cross-scale cooperation and coordination. This chapter addresses research question 1 (*refer to section 1.3*). I wrote this paper with supervision support from Prof. J. Gambiza and Prof M. Schoon.

Publication:

Falayi, M., Gambiza, J., Schoon, M. 2021. A scoping review of environmental governance challenges in southern Africa from 2010 to 2020. *Environmental Conservation*:48(4), 235-243.https://doi.org/10.1017/S0376892921000333

Chapter 3: 'The ghost of environmental history': Analysing the evolving governance of the Machubeni landscape in South Africa. This chapter contributes to studies that have assessed the evolution of natural resource governance systems in South Africa. In this chapter, I argue that history matters when analysing the evolution of governance in postcolonial territories like Machubeni. I reason that, if we are to understand the interactions between governance and rangeland condition into the future, we need to unpack how historical and contemporary drivers and other changes have shaped the dynamics of environment governance (specific structures, institutions and processes) and their combined relationships with rangeland degradation and larger-scale interactions (policies and legislation). The findings show that the disempowerment of people leads to the degradation of natural resources, and the residual impacts of the colonial drivers' 'ghost of environmental history' are evident at landscape level. This chapter addresses research question 2 (*refer to section 1.3*). I wrote this paper with supervision support from Prof. J. Gambiza and Prof M. Schoon.

Publication:

Falayi, M., Gambiza, J., Schoon, M. The 'ghost of environmental history': Analysing the evolving governance of the Machubeni landscape in South Africa. Accepted: in press with *People and Nature* (see Appendix 2)

Chapter 4: Unpacking changing multi-actor and multi-level actor ties in transformative spaces: Insights from a degraded landscape, Machubeni, South Africa. This paper examines the changing dynamics of multi-actor ties over a period of two years in Machubeni, South Africa. The findings of this paper highlight the importance of building the capacity and social capital of less powerful actors to ensure that they can organize themselves. This chapter addresses research question 3 (*refer to section 1.3*). I wrote this paper with supervision support from Prof J. Gambiza and Prof M. Schoon.

Publication:

Falayi, M., Gambiza, J., Schoon, M. 2020. Unpacking multi-actor and multi-level actor ties in transformative spaces: Insights from a degraded landscape, Machubeni, South Africa. Land 9, 227. https://doi.org/10.3390/land9070227

Chapter 5: The importance of agency in fractured governance contexts: A southern African perspective. This chapter shows that within the rich discourse concerning the interactive role of institutions, structures, and processes, inadequate attention has been paid to the importance of agency in natural resource governance discourse. I argue that agency is of central importance in understanding the effectiveness of environmental governance. This chapter shows that despite the careful design of co-management initiatives in southern Africa, governance appears to have been considerably weakened by a lack of adequate support for the individual and collective agency. This chapter addresses research question 4 (*refer to section 1.3*). I wrote this paper, and Prof J. Gambiza, Prof M. Schoon, Dr G. Cundill, Prof A. Palmer, L Sisitka, Prof G. Cumming, Prof D. Cumming and Prof C. Palmer assisted with the development of the ideas and with the editing of this paper.

Publication:

Falayi, M., Gambiza, J., Schoon, M., Cundill G., Palmer A., Sisitka L., Cumming G., Cumming D., Palmer C. The Importance of Agency in Fractured Governance Contexts: A Southern African Perspective. In the third stage review with *Ecology and Society* (see Appendix 3).

Chapter 6: Synthesis, reflections and recommendations. This final chapter summarises the findings in the context of governance concepts. This chapter includes recommendations for enhancing and building effective governance systems.

1.5 References

Adams, E. A., L. Juran, and I. Ajibade. 2018. 'Spaces of Exclusion' in community water governance: A Feminist Political Ecology of gender and participation in Malawi's Urban Water User Associations. *Geoforum* 95:133–142.

Agrawal, A. 2010. Local institutions and adaptation to climate change. *Social dimensions of climate change: Equity and vulnerability in a warming world* 2:173–178.

Archer, E., L. Dziba, K. J. Mulongoy, M. A. Maoela, M. Walters, R. O. Biggs, M.-C. Cormier Salem, F. Declerck, M. C. Diaw, A. E. Dunham, P. Failler, C. Gordon, K. A. Harhash, R. Kasisi, F. Kizito, W. Nyingi, N. Oguge, B. Osman-Elasha, L. C. Stringer, L. Tito De Morais, A. Assogbadjo, B. N. Egoh, M. W. Halmy, K. Heubach, A. Mensah, L. Pereira, and N. Sitas. 2018. *The regional assessment report on biodiversity and ecosystem services for Africa: summary for policymakers*. IPBES.

Archer, M. S. 1995. *Realist Social Theory: The Morphogenetic Approach*. Cambridge University Press.

Barnes, G., and B. Child. 2014. *Adaptive Cross-scalar Governance of Natural Resources*. Routledge, London.

Barnosky, A. D., E. A. Hadly, J. Bascompte, E. L. Berlow, J. H. Brown, M. Fortelius, W. M. Getz, J. Harte, A. Hastings, P. A. Marquet, N. D. Martinez, A. Mooers, P. Roopnarine, G. Vermeij, J. W. Williams, R. Gillespie, J. Kitzes, C. Marshall, N. Matzke, D. P. Mindell, E. Revilla, and A. B. Smith. 2012. Approaching a state shift in Earth's biosphere. *Nature* 486(7401):52–58.

Bennett, J. E. 2013. Institutions and governance of communal rangelands in South Africa. *African Journal of Range & Forage Science* 30(1–2):77–83.

Bennett, N. J., and T. Satterfield. 2018. Environmental governance: A practical framework to guide design, evaluation, and analysis. *Conservation Letters* 11(6):e12600.

Bodin, Ö. 2017. Collaborative environmental governance: Achieving collective action in social-ecological systems. *Science* 357(6352).

Boyd, E., B. Nykvist, S. Borgström, and I. A. Stacewicz. 2015. Anticipatory governance for social-ecological resilience. *AMBIO* 44(1):149–161.

Bruns, B. 2019. *Practising Polycentric Governance in Governing Complexity: Analyzing and Applying Polycentricity*. Cambridge University Press.

Carlisle, K., and R. L. Gruby. 2019. Polycentric Systems of Governance: A Theoretical Model for the Commons. *Policy Studies Journal* 47(4):927–952.

Carlsson, L., and F. Berkes. 2005. Co-management: concepts and methodological implications. *Journal of Environmental Management* 75(1):65–76.

Chaffin, B. C., H. Gosnell, and B. A. Cosens. 2014. A decade of adaptive governance scholarship: synthesis and future directions. *Ecology and Society* 19(3).

Child, B., and G. Barnes. 2010. The conceptual evolution and practice of community-based natural resource management in southern Africa: past, present and future. *Environmental Conservation* 37(3):283–295.

Chinangwa, L., F. Sinclair, A. S. Pullin, and N. Hockley. 2016. Can co-management of government forest reserves achieve devolution? Evidence from Malawi. *Forests, Trees and Livelihoods* 25(1):41–58.

Clapham, P. J. 2017. Japan disregards whaling review again. *Nature* 547(7661):32–32.

Creswell, J. W., and V. Clark. 2011. Designing and Conducting Mixed Methods Research. Third edition. SAGE.

Creswell, J. W. 2014. *A Concise Introduction to Mixed Methods Research*. SAGE Publications.

Cockburn, J., G. Cundill, S. Shackleton, M. Rouget, M. Zwinkels, S. F. (Ancia) Cornelius, L. Metcalfe, and D. Van den Broeck. 2019. Collaborative stewardship in multifunctional landscapes: Toward relational, pluralistic approaches. *Ecology and Society*.

Cockburn, J., E. Rosenberg, A. Copteros, S. F. (Ancia) Cornelius, N. Libala, L. Metcalfe, and B. van der Waal. 2020. A Relational Approach to Landscape Stewardship: Towards a New Perspective for Multi-Actor Collaboration. *Land* 9(7):224.

Congleton, R. D. 2007. Review of understanding institutional diversity, by E.Ostrom. *Springer* 132:509-511.

Cumming, G. S., G. Epstein, J. M. Anderies, C. I. Apetrei, J. Baggio, Ö. Bodin, S. Chawla, H. S. Clements, M. Cox, L. Egli, G. G. Gurney, M. Lubell, N. Magliocca, T. H. Morrison, B. Müller, R. Seppelt, M. Schlüter, H. Unnikrishnan, S. Villamayor-Tomas, and C. M. Weible. 2020. Advancing understanding of natural resource governance: a post-Ostrom research agenda. *Current Opinion in Environmental Sustainability* 44:26–34.

Cundill, G., and C. Fabricius. 2008. *Adaptive co-management under resource-poor conditions: Lessons from South Africa. In Exploring Sustainability Science: A Southern African Perspective*. Burns, S., Weaver, A., Eds. Sun Press: Stellenbosch, South Africa.

Cundill, G., and C. Fabricius. 2010. Monitoring the Governance Dimension of Natural Resource Co-management. *Ecology and Society* 15(1).

Dietz, T., E. Ostrom, and P. C. Stern. 2003. The struggle to govern the commons. *Science* 302(5652):1907–1912.

Epstein, G., J. Pittman, S. M. Alexander, S. Berdej, T. Dyck, U. Kreitmair, K. J. Rathwell, S. Villamayor-Tomas, J. Vogt, and D. Armitage. 2015. Institutional fit and the sustainability of social–ecological systems. *Current Opinion in Environmental Sustainability* 14:34–40.

Fabricius, C., and G. Cundill. 2010. Building Adaptive Capacity in Systems Beyond the Threshold: The Story of Macubeni, South Africa. Pages 43–68 *in* D. Armitage and R. Plummer, editors. *Adaptive Capacity and Environmental Governance*. Springer Berlin Heidelberg, Berlin, Heidelberg.

Fabricius, C., E. Koch, S. Turner, and H. Magome. 2004. *Rights Resources and Rural Development: Community-based Natural Resource Management in Southern Africa*. Routledge.

Falayi, M., J. Gambiza, and M. Schoon. 2022. 'The ghost of environmental history': Analysing the evolving governance of communal rangeland resources in Machubeni, South Africa. *People and Nature* in press:1–18.

Falayi, M., J. Gambiza, and M. Schoon. 2021. A scoping review of environmental governance challenges in southern Africa from 2010 to 2020. *Environmental Conservation*: 48(4), 235-243.

Falayi, M., J. Gambiza, and M. Schoon. 2020. Unpacking Changing Multi-Actor and Multilevel Actor Ties in Transformative Spaces: Insights from a Degraded Landscape, Machubeni, South Africa. *Land* 9(7):227.

Falayi, M., S. E. Shackleton, G. C. Kemp, and C. M. Shackleton. 2019. Changes in household use and sale of locally collected environmental resources over a 15-year period in a rural village, South Africa. *Forests, Trees and Livelihoods* 28(2):90–107.

Favretto, N., S. Shackleton, S. M. Sallu, and T. Hoffman. 2021. Editorial for Special Issue: "Collaboration and Multi-Stakeholder Engagement in Landscape Governance and Management in Africa: Lessons from Practice." *Land* 10(3):285.

Ferguson-Cradler, G. 2018. Fisheries' collapse and the making of a global event, 1950s–1970s. *Journal of Global History* 13(3):399–424.

Folke, C., S. Carpenter, B. Walker, M. Scheffer, T. Elmqvist, L. Gunderson, and C. S. Holling. 2004. Regime Shifts, Resilience, and Biodiversity in Ecosystem Management. *Annual Review of Ecology, Evolution, and Systematics* 35(1):557–581.

Folke, C., T. Hahn, P. Olsson, and J. Norberg. 2005. Adaptive Governance of Social-Ecological Systems. *Annual Review of Environment and Resources* 30(1):441–473.

Hallowell, N., J. Lawton, and G. Gregory. 2004. *Reflections on Research: The Realities Of Doing Research In The Social Sciences*. McGraw-Hill Education (UK).

Holling, C. S., and L. H. Gunderson. 2002. Resilience and adaptive cycles. *In: Panarchy: Understanding Transformations in Human and Natural Systems, 25-62*.

Hughes, J. D. 2016. *What is Environmental History?* John Wiley & Sons.

Klein, J. T. 2004. Prospects for transdisciplinarity. *Futures* 36(4):515–526.

Keen, M., V. A. Brown, and R. Dyball. 2005. *Social Learning in Environmental Management: Towards a Sustainable Future*. Routledge.

Keohane, R. O., and E. Ostrom. 1994. *Local Commons and Global Interdependence*. SAGE.

Kusters, K., M. De Graaf, L. Buck, K. Galido, A. Maindo, H. Mendoza, T. H. Nghi, E. Purwanto, and R. Zagt. 2020. Inclusive Landscape Governance for Sustainable Development: Assessment Methodology and Lessons for Civil Society Organizations. *Land* 9(4):128.

Lockwood, M., J. Davidson, A. Curtis, E. Stratford, and R. Griffith. 2010. Governance Principles for Natural Resource Management. *Society & Natural Resources* 23(10):986–1001.

Millennium Ecosystem Assessment 2005. *Ecosystems and Human Well-being: Synthesis*. Island Press.

Makaya, E., M. Rohse, R. Day, C. Vogel, L. Mehta, L. McEwen, S. Rangecroft, and A. F. Van Loon. 2020. Water governance challenges in rural South Africa: exploring institutional coordination in drought management. *Water Policy* 22(4):519–540.

McGinnis, M. D., and E. Ostrom. 2012. Reflections on Vincent Ostrom, Public Administration, and Polycentricity. *Public Administration Review* 72(1):15–25.

McGinnis, M. D., and E. Ostrom. 2014. Social-ecological system framework: initial changes and continuing challenges. *Ecology and Society* 19(2):1–13.

McNeill, J. R. 2016. *The Great Acceleration*. Page *The Great Acceleration*. Harvard University Press.

Mustelin, J., N. Kuruppu, A. M. Kramer, J. Daron, K. de Bruin, and A. G. Noriega. 2013. Climate adaptation research for the next generation. *Climate and Development* 5(3):189–193.

Mutekwa, V. T., and J. Gambiza. 2016. Assessment of governance principles application in forest protected areas: the case of six state forests in western Zimbabwe. *International Forestry Review* 18(4):466–484.

Mutekwa, V. T., and J. Gambiza. 2017. Forest protected areas governance in Zimbabwe: Shift needed away from a long history of local community exclusion. *Journal of environmental management* 198:330–339.

Nkhata, B., and C. Breen. 2010. Performance of community-based natural resource governance for the Kafue Flats (Zambia). *Environmental Conservation* 37(3):296–302.

North, D. C. 1990. *Institutions, institutional change and economic performance*. Cambridge University Press, New York.

Ostrom, E. 1994. *The meaning of American federalism.* Institute for contemporary studies Press., San Francisco, CA.

Ostrom, E. 2009. A general framework for analyzing sustainability of social-ecological systems. Science 325(5939):419–422.

Ostrom, E. 2010a. A Long Polycentric Journey. *Annual Review of Political Science* 13(1):1–23.

Ostrom, E. 2010b. Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *American Economic Review* 100(3):641–672.

Ostrom, E., R. Gardner, J. Walker, and J. Walker. 1994. *Rules, games, and common-pool resources*. University of Michigan Press.

Pereira, L., T. Karpouzoglou, N. Frantzeskaki, and P. Olsson. 2018. Designing transformative spaces for sustainability in social-ecological systems. *Ecology and Society* 23(4).

Potts, R. 2020. Disconnected dots?: A systematic review of governance challenges for natural resource management. *Journal of Environmental Planning and Management* 63(8):1356–1374.

Ransome, P. 2013. *Ethics and Values in Social Research*. Macmillan International Higher Education.

Reed, M., A. C. Evely, G. Cundill, I. R. A. Fazey, J. Glass, A. Laing, J. Newig, B. Parrish, C. Prell, C. Raymond, and L. Stringer. 2010. What is social learning?

Reed, M. S. 2008. Stakeholder participation for environmental management: A literature review. *Biological Conservation* 141(10):2417–2431.

Scholes, R., L. Montanarella, A. Brainich, N. Barger, B. ten Brink, M. Cantele, B. Erasmus, J. Fisher, T. Gardner, and T. G. Holland. 2018. Summary for Policymakers of the Thematic Assessment Report on Land Degradation and Restoration of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. *IPBES Secretariat: Bonn, Germany*:1–31.

Schoon, M. 2013. Governance in Transboundary Conservation: How Institutional Structure and Path Dependence Matter. *Conservation and Society* 11(4):420.

Schoon, M. L., M. D. Robards, C. L. Meek, and V. Galaz. 2015. Principle 7 – Promote polycentric governance systems. *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems*:226–250.

Schultz, L., C. Folke, H. Österblom, and P. Olsson. 2015. Adaptive governance, ecosystem management, and natural capital. *Proceedings of the National Academy of Sciences*:201406493.

Shackleton, C. M., and J. Gambiza. 2008. Social and ecological trade-offs in combating land degradation: the case of invasion by a woody shrub (Euryops floribundus) at Macubeni, South Africa. *Land degradation & development* 19(4):454–464.

Shackleton, S., and M. Luckert. 2015. Changing Livelihoods and Landscapes in the Rural Eastern Cape, South Africa: Past Influences and Future Trajectories. *Land* 4(4):1060–1089.

Shereni, N. C., and J. Saarinen. 2021. Community perceptions on the benefits and challenges of community-based natural resources management in Zimbabwe. *Development Southern Africa* 38(6):879–895.

Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney, and C. Ludwig. 2015. The trajectory of the Anthropocene: The Great Acceleration: *The Anthropocene Review*.

Thondhlana, G., and E. Muchapondwa. 2014. Dependence on environmental resources and implications for household welfare: Evidence from the Kalahari drylands, South Africa. *Ecological economics* 108:59–67.

Tschakert, P., and K. A. Dietrich. 2010. Anticipatory Learning for Climate Change Adaptation and Resilience. *Ecology and Society* 15(2).

Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. 2004. Resilience, Adaptability and Transformability in Social–ecological Systems. *Ecology and Society* 9(2).

Williams, P., L. Sikutshwa, and S. Shackleton. 2020. Acknowledging Indigenous and Local Knowledge to Facilitate Collaboration in Landscape Approaches—Lessons from a Systematic Review. *Land* 9(9):331.

Zemp, D. C., C.-F. Schleussner, H. M. J. Barbosa, and A. Rammig. 2017. Deforestation effects on Amazon Forest resilience. *Geophysical Research Letters* 44(12):6182–6190.

Chapter 2: A scoping review of environmental governance challenges in southern Africa from 2010 to 2020

This chapter was published as: Falayi, M., Gambiza, J., Schoon, M. 2021. A scoping review of environmental governance challenges in southern Africa from 2010 to 2020. *Environmental Conservation*:48(4), 235-243. https://doi.org/10.1017/S0376892921000333

Abstract

Throughout southern Africa, there have been growing concerns regarding the rates of ecosystem degradation. This issue and natural resource governance concerns in general remain a key challenge. We conducted a scoping review of 135 articles to inductively assess how governance challenges have manifested in natural resource management during 2010-2020 in southern Africa. The paper's findings show that governance challenges in southern Africa are 'hydra-headed'. Results suggest that governance challenges related to the maintenance of system integrity and functioning-specifically lack of coordination, accountability, capacity, skills and resources to define effective natural resource management - were the most reported in literature. Challenges related to achieving socially equitable governance were the second most mentioned, followed by those related to institutional robustness. Challenges related to the adaptability and flexibility of institutions - specifically learning, monitoring capacity and innovation - were the least identified, showing that these areas are poorly studied, or these attributes are considered less problematic in achieving sustainable outcomes. Furthermore, the review highlights critical gaps: the limited engagement with governance related frameworks, specifically polycentricity, adaptive governance and social-ecological stewardship. In concluding, we highlight governance reforms and future research needs on the topic of natural resources in southern Africa.

Keywords: effective governance; environmental governance; governance challenges; natural resource management; responsive governance.

2.1 Introduction

Natural resources play a pivotal role in supporting human livelihoods (Fabricius et al. 2004, Shackleton et al. 2008). For example, communities in southern Africa get their food, fuel and construction materials from natural sources (e.g. Falayi et al. 2019, Sardeshpande and Shackleton 2020) such as forests, fisheries and 'everyday' resources such as bees, water and fuelwood (Fabricius et al. 2004). Resource use has exponentially increased over the past 50 years (Steffen et al. 2015), resulting in biodiversity loss in Africa (Archer et al. 2018). Rapid human population growth, poaching, deforestation and illegal wildlife trading are some of the key drivers accelerating biodiversity loss (Archer et al. 2018). Failure to address these drivers may increase the rate of ecosystem degradation (Scholes et al. 2018) and ultimately erode people's livelihoods. Addressing these challenges is important for achieving sustainable resource use (Archer et al. 2018, Scholes et al. 2018); however, environmental governance and management continue to be major challenges in southern Africa (Child and Barnes 2010).

Recognition of these challenges has promoted the development of analytical frameworks such as adaptive governance/co-management (Olsson et al. 2004, Folke et al. 2005), transformative governance (Chaffin et al. 2016) and institutional governance (Paavola 2007), among others. These frameworks emphasize that multi-actor and multi-level interactions are central to achieving desirable governance and co-management outcomes. In its basic form, governance is concerned with managing individual or collective actions to pursue socially sustainable outcomes (Bennett and Satterfield 2018). In this context, governance refers to the ordering of relationships between people and groups of people through institutions, structures and processes (Ostrom 1994).

Despite the shift towards people-centred and inclusive governance approaches in southern Africa (Moswete et al. 2019), natural resource governance challenges have outnumbered conservation successes (e.g. Cundill 2010, Mutekwa and Gambiza 2016). Several studies identify and examine governance challenges that limit the capacity of natural resource management systems at local or national scales in southern Africa (e.g. Orchard and Stringer 2016, Hegga et al. 2020). For example, weak public accountability, multi-actor participation, absence of political will and lack of income distribution plans have been widely

mentioned in community-based natural resource management (CBNRM) initiatives in Botswana, Namibia, Zambia and Zimbabwe (Kozanayi et al. 2014, Stone et al. 2019). These challenges impair system function and integrity, resulting in negative feedback loops (O'Higgins et al. 2014). This suggests that governance challenges limit the capacity for natural resource systems to deliver environmentally and socially sustainable outcomes (Pahl-Wostl 2009).

At a global scale, Potts (2020) highlighted that governance systems continue to struggle to improve social-ecological systems because of factors inhibiting the connectivity between actors, structures, institutions and processes. However, the absence of review studies that focus on governance challenges at the regional scale, particularly in the southern African region, means that understanding remains limited. This paper contributes to a body of literature and discussions around natural resource governance and management in southern Africa. Using a scoping review methodology (Arksey and O'Malley 2005), the paper's main objective was to explore how governance challenges have manifested in natural resource systems during 2010–2020 in southern Africa. The specific research questions were: what are the broad characteristics of the studies selected, the dominant concepts identified and the challenges limiting the capacity of natural resource management? Answers to these questions are important in two ways. First, they will provide critical insights into where greater support is needed to improve the capacity, functioning and performance of governance systems in southern Africa. Second, they offer insights into future research prospects that are context-specific to southern Africa.

2.2 Materials and methods

2.2.1 Selection of articles

Scoping reviews are used to comprehensively synthesize available knowledge on a topic (Arksey and O'Malley 2005). They provide an overview of the state of knowledge in a field, document knowledge gaps and shape future research agendas (O'Brien et al. 2016). We adopted a scoping review approach for this study because our main aim was to provide a narrative assessment of the governance challenges in southern Africa during 2010–2020. This

period reflects challenges in natural resource governance over the last decade, given the shift towards theoretically sound governance approaches such as co-management, adaptive governance and polycentricity, to mention but a few (e.g. Cundill 2010, Mutekwa and Gambiza 2016). We applied a scoping review methodological framework proposed by Arksey and O'Malley (2005) and further refined by the Joanna Briggs Institute (JBI; Peters et al. 2015). The review was conducted iteratively, involving numerous steps that were largely sequential.

The first step was to develop a protocol that guided this research (see Appendix 4), available online. We refined the framework of Bennett and Satterfield (2018) to structure, analyse and explore governance challenges (Table 2.1).

Table 2.1 Governance objectives and attributes adapted from Bennett and Satterfield (2018)

Governance objective	Attributes of governance
Effective environmental governance	Direction, coordination, capacity, informed, accountable and efficient
Equitable environmental governance	Recognition, participation, fair and just
Responsive environmental governance	Learning, anticipatory, adaptive, innovative and flexible
Robust environmental governance	Legitimate, connected, nested and polycentric

The framework of Bennett and Satterfield (2018) was adopted for this study because it provides a wide-ranging set of attributes and elements of environmental governance as compared to other analytical frameworks (e.g. adaptive governance and good governance). The framework highlights the four key objectives of governance: to be effective, equitable, responsive and robust (Table 2.1). These objectives come from the rich history of environmental governance scholarship (see Graham et al. 2003, Lockwood 2010). The four objectives and attributes by Bennett and Satterfield "were engaged with simultaneously as there can be interactions- both synergies and trade-offs- between them" (Bennett and

Satterfield 2018 p 10). The first objective – effective environmental governance – refers to the importance of maintaining or improving both ecological and societal system integrity and functioning (Bennet and Satterfield 2018). The second objective – equitable environmental governance – underscores the importance of engaging with multiple decision-making processes to produce socio-economic outcomes that are inclusive, fair, just and participatory. The third objective – to be responsive – draws attention to governance systems that are adaptable to changing socio-ecological conditions. Finally, robust environmental governance as the fourth objective emphasizes that 'functioning institutions persist, maintain performance, and cope with perturbations and crises' (Bennett and Satterfield 2018: 7). As is reflected in Table 2.1, this more comprehensive understanding enabled us to identify the dominant governance challenges in southern Africa.

The second step was defining the research aim, which examines natural resource governance challenges in southern Africa during 2010–2020. The third step was literature gathering using the databases Web of Science, Scopus and EBSCOhost. Web of Science and Scopus are considered to be the two largest online databases worldwide (Biesbroek et al. 2018), and EBSCOhost provided comprehensive coverage of African studies. The search strings included a combination of keywords used in environmental governance discourse ('governance' OR 'environmental governance' OR 'environmental management' OR 'natural resource governance' OR 'natural resource management') AND ('southern Africa'), with southern Africa replaced by each of the 16 countries within the Southern Africa Development Community (SADC) region in the period 2010–2020 (starting 1 January 2010 and ending on 31 December 2020 when the study commenced). Within the search string, we did not use the word 'challenges' in order to avoid biases. In the environmental governance literature, authors use numerous words such as 'barriers', 'problems' and 'limitations' to refer to challenges. Therefore, challenges, limitations and barriers were identified through a manual scan of the abstracts and results sections of articles. We identified governance challenges using the attributes described and defined by Bennett and Satterfield (2018) (Table 2.1).

A total of 3538 peer-reviewed academic articles were retrieved from the selected databases. The articles were examined using the following criteria:

1. The articles needed to focus on the governance of natural resources in southern Africa, encompassing the 16 countries in the SADC: Angola, Botswana, Comoros, Democratic Republic of the Congo (DRC), Eswatini (Swaziland), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe.

2. Articles referring to different governance-based approaches such as adaptive governance, adaptive management, adaptive co-management, common-pool resource governance, CBNRM governance systems, good governance and polycentric governance, amongst many others, were included.

3. Articles needed to refer to at least one challenge that is affecting the governance and management of natural resources.

4. The articles needed to be in English.

The fourth step involved screening: 987 duplicate articles were removed, title screening excluded another 2101 articles and abstract screening excluded a further 191 articles. Some of the excluded articles were not in English and some were not related to the governance of natural resources in southern Africa. In line with the JBI scoping review framework, two independent reviewers with knowledge of natural resource governance and management were requested to conduct a double-screening process; this was to reduce the level of bias and increase thoroughness in selecting articles for full review (Waffenschmidt et al. 2019). Independent reviewer number 1 identified 268 articles for the eligibility stage, while independent reviewer number 2 identified 265 articles for the eligibility stage. The differences in the number of articles identified by the two independent reviewers prompted us to refine our inclusion criteria because the reviewers included articles that compared southern African region case studies with case studies from outside the region. We therefore refined our

inclusion criteria to articles that explicitly explore governance challenges within the southern African region only, and a further 46 articles were excluded.

A total of 213 articles were included for the full-text screening, and a further 88 articles were excluded because they did not explicitly explore governance challenges within the southern African region and the topics were unrelated to natural resource governance. The review of the reference list resulted in an additional ten articles. The same two independent reviewers with knowledge of natural resource systems were asked again to conduct a double-screening process to validate our findings. The agreement between the first author and independent reviewer number 1 was 89%, and the percentage of agreement between the first author and independent reviewer number 2 was 94%. Therefore, on aggregate, a total of 135 articles were considered for the in-depth review, where the appropriate information related to governance challenges was analysed.

2.2.2 Analysis of selected articles

The final step involved data analysis. To answer our main objective, we referred directly to the articles to check for answers to the following questions: (1) What is the broad characterization of the studies selected? (2) What are the dominant concepts identified? and (3) what are the challenges identified? A database of bibliographic references, authors' names, article title, year of publication, country of focus, type of article and governance challenges was created in *Microsoft Excel* (Vincent and Cundill 2021). To explore the broad characterization of the studies selected, the papers' content was manually analysed based on the date of publication, location of research, overall article approach, scale of analysis and the natural resource sector (Potts 2020). Descriptive analysis was carried out using *Microsoft Excel*. We used open coding to explore the dominant concepts or conceptual insights within the database. Here open coding refers to the initial process by which raw data are analysed and categorised (Burnard et al. 2018). Analytical notes were written alongside each article to identify the concepts/themes discussed (e.g. adaptive governance, polycentricity or social-ecological stewardship). To identify governance challenges, textual data (see the 'Results' section) were manually coded based on the governance attributes described in Table 2.1. Manual coding involved identifying words, sentences or phrases relating to governance

challenges (Olagunju et al. 2019). This process resulted in the emergence of analytical notes that identified the presence or absence of governance challenges. The coded data for each article were then categorized based on the four main objectives of environmental governance (Table 2.1). Some of the articles mentioned or identified more than one challenge; therefore, this means one paper could be sorted into two different categories. The categories were iteratively revised to reflect the presence and absence of governance challenges.

2.2.3 Limitations

We acknowledge some limitations to the scoping review method employed in this study. To address potential bias and limitations in rigour (Grant and Booth 2009), we used the double-screening procedure (Peters et al. 2015) involving two independent reviewers who had knowledge of environmental governance in southern Africa to assess which articles met the scoping review criteria. The procedure enabled us to (1) reduce the risk of exclusion and inclusion errors and (2) reframe the inclusion and exclusion criteria.

2.3 Results

2.3.1 Broad characterisation of the selected articles

A total of 135 articles met the inclusion criteria. The number of articles discussing governance challenges decreased between 2010 and 2012, followed by an increase between 2013 and 2016 and a decline between 2017 and 2020 (Figure 2.1). Thus, in terms of academic outputs, an explicit research agenda on governance challenges has not surged since 2010 (Figure 2.1). The review identified only six articles that explicitly referred to ‘governance challenges’ in the title only; this shows that this topic has not coalesced in southern Africa since 2010 (Figure 2.1).

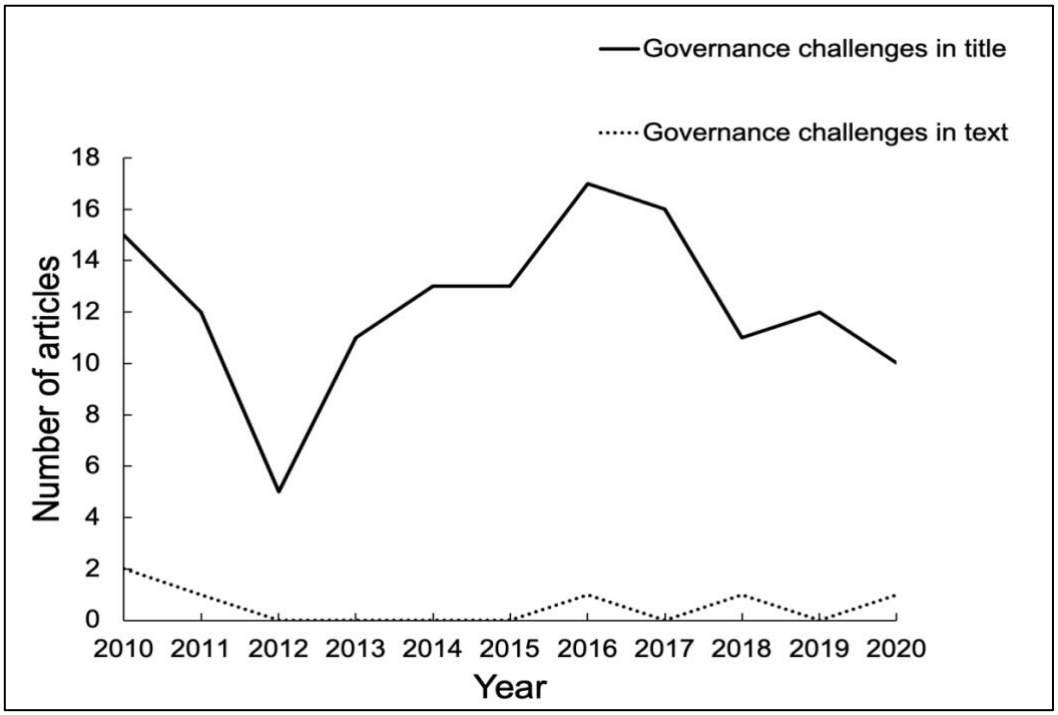


Figure 2.1 Plot of the number of articles published annually during 2010-2020 in which 'environmental governance challenges' was referred to in the title only or somewhere in the text

Countries with at least ten articles that met the criteria for inclusion were Botswana, Madagascar, South Africa, Tanzania and Zambia (Table 2.2). South Africa accounted for 28.1% (n = 38) of the articles, followed by Tanzania at 15.6% (n = 21) and Botswana at 11.9% (n = 16).

Table 2.2 General descriptions of articles reviewed (n=135)

Categorisation	**No. of articles**	**% of articles**
Countries with at least ten articles		
South Africa	38	28.1
Tanzania	21	15.6
Botswana	16	11.9
Madagascar	11	8.1
Zambia	11	8.1
Others	32	23.7
Overall article approach		
Case study articles	127	94.0
Literature review/synthesis	8	5.9
Scale of analysis		
Comparative	2	1.5
Local	92	68.1
National	25	18.5
Regional	6	4.4
Transboundary	10	7.4
Natural resource sector		
Conservation/national park	46	34.1
Fisheries	17	12.6
Forestry	16	11.9
Rangelands	6	4.4
Water/rivers	50	37.0

Countries with more than one article included Angola, DRC, Eswatini, Lesotho, Malawi, Mozambique, Namibia and Zimbabwe; these together accounted for 23.7% (n = 32) of the articles. There were no articles from Comoros, Mauritius or Seychelles. Of the 135 articles

that met the inclusion criteria, 94.0% (n = 127) were case studies and 5.9% (n = 8) were literature reviews or synthesis articles (Table 2.2).

Notably, 68.1% (n = 92) of the articles discussed governance challenges at a local scale and 18.5% (n = 25) did so at a national scale. Transboundary studies accounted for 7.4% (n = 10) of the articles, the majority of which were geographically focused on the Okavango river basin, the Kgalagadi Transfrontier Park and the Great Limpopo Transfrontier Park (GLTP) (e.g. Schoon 2013). Only 4.4% (n = 6) have focused on the regional governance challenges. Of the 135 articles included, 37.0% (n = 50) discussed governance challenges surrounding water/rivers, 34.1% (n = 46) discussed conservation/national parks, 11.9% (n = 16) discussed forestry and 12.6% (n = 17) discussed fisheries. Only 3.7% (n = 6) of the articles discussed governance challenges relating to rangelands.

2.3.2 Dominant themes identified

The top six key institutional themes that emerged from the review were adaptive governance, adaptive co-management, common-pool resource governance (CPRG), community-based natural resource governance (CBNRG), integrated water resource management (IWRM) and polycentricity. Governance challenges are discussed across different governance-based approaches in southern Africa. Overall, articles that focused on a case study approach had a strong emphasis on concepts of CBNRG (57.7%) and IWRM (27.4%). Articles closely linked to IWRM explored institutional themes related to water reforms (n = 5; e.g. Mehta et al. 2014) and legal aspects (n = 2; e.g. Mogomotsi et al. 2020). Notably, 17% of the articles put special emphasis on applying Ostrom's common pool theory (e.g. Bollig and Menestrey Schwieger 2014, Wiederkehr et al. 2019). There was a dearth of studies explicitly applying the concepts of adaptive governance, co-management, social-ecological stewardship and polycentricity (e.g. Chinangwa et al. 2016, Thondhlana et al. 2016, Cockburn et al. 2019). Other themes that emerged from the articles were livelihoods (n = 5), poverty (n = 3) and gender (n = 4). Adams et al. (2018) investigate how gender dynamics in the water resource discourse influence participation and decision-making.

2.3.3 Governance challenges in southern Africa

Table 2.3 highlights governance challenges in southern Africa as reported by the 135 articles that met the inclusion criteria. The governance challenges were divided into four broad categories.

Table 2.3 Governance challenges impeding effective management of natural resources (n=135)

Governance challenges identified	No. of articles	Key source references
Effective: Challenges related to the maintenance of system integrity and functioning	129	Schoon (2013), Chinangwa et al. (2016), Orchard and Stringer (2016), Hegga et al. (2020)
Equitable: Challenges related to inclusive processes and fair outcomes	108	Mandara et al. (2017), Adams et al. (2018), Cockburn et al. (2019), Long et al. (2019), Salmoral et al. (2019), Gwiriri and Bennett (2020)
Responsive: Challenges related to adaptability and flexibility of the institution	16	Cundill (2010), Knüppe and Meissner (2016), Falayi et al. (2019), Milupi et al. (2020)
Robust: Challenges related to institutional performance	93	Komakech and van der Zaag (2013), Dyer et al. (2014), Thondhlana et al. (2015), Chinangwa et al. (2016), Makaya et al. (2020)

Governance challenges in southern Africa are multifaceted, and they overlap. Overall, governance challenges related to the maintenance of system integrity and functioning have been the most frequently reported (n = 129), followed by challenges related to equitability (n = 108) and institutional robustness (n = 93) (Table 2.3). Challenges related to the adaptability and flexibility of institutions to changing environmental and social conditions were the least

reported (n = 16). This includes challenges relating to social learning, anticipatory learning, adaptive governance and innovation, which were the least reported on.

2.3.4 Effectiveness: challenges related to the maintenance of system integrity and functioning

Governance challenges related to the maintenance of system integrity and functioning, specifically lack of coordination, accountability, capacity, skills and resources to define effective natural resource management, were the most reported on across the 135 articles (Table 2.3). The majority of the articles mentioned lack of funding, leadership, inadequate conflict resolution mechanisms and leakages of human capital as the major challenges inhibiting effective governance (Nkhata and Breen 2010, Pollini and Lassoie 2011, Makaya et al. 2020). Here leakages of human capital refers to emigration of highly trained people. Of these challenges, lack of funding was the most recurrent theme inhibiting governance across scales (e.g. Chiluwe and Nkhata 2014). Several articles stressed that lack of funding inhibited multi-actor participation, thereby hindering successful governance (e.g. Orchard and Stringer 2016, Long et al. 2019). In some instances, lack of funding in the forestry sector intensified leakages of experienced technical officers, and this affected successful forestry management in Zimbabwe (Mutekwa and Gambiza 2016). Schoon (2013) noted that lack of financial sustainability is a key operational challenge within the GLTP, illustrating transboundary governance fractures in South Africa, Mozambique and Zimbabwe.

Many papers cited the lack of accountability and procedures for holding actors accountable as the second most common challenge relating to effectiveness. Factors limiting accountability were unclear policies, corruption, lack of participation and complex community ties. From a local-scale perspective, we identified that social ties limited accountability. In Madagascar, Gardner et al. (2020) highlighted that rule application is sometimes infrequently enforced to avoid conflict among community members. We also found that a lack of downward accountability and a lack of clarity in the division of roles has impeded the devolution of governance (e.g. Zuka 2016). Challenges arising from the unclear division of roles were a lack of transparency, rule enforcement and limited coordination. In a study of

water governance in Namibia, Hegga et al. (2020) found that it is difficult to hold responsible actors accountable where there are unclear or overlapping roles amongst actors.

Challenges arising due to unclear procedures and aims often resulted in enforcement vacuums, thus hindering the effective management of natural resources. Cross-sectoral coordination vacuums and discrepancies between policies and realities in the field were cited as key governance challenges hindering effectiveness in southern Africa. This is evident in a private game farming case study in South Africa, where enforcement vacuums have emanated from unclear mandates between two government line ministries (Kamuti 2014).

Furthermore, the unavailability of relevant knowledge (socio-economic, environmental and historical) in guiding management actions was commonly cited as a knowledge-related governance challenge. The reasons behind the unavailability of different types of knowledge were lack of cross-scale learning, bureaucracy, limited recognition of indigenous knowledge and declining knowledge regarding indigenous systems (e.g. Cassidy et al. 2011, Katikiro et al. 2015, Makaya et al. 2020). In Tanzania, Katikiro et al. (2015) highlighted that challenges for effectively integrating indigenous knowledge systems into marine studies were due to fear of conservation restrictions, while in Botswana, indigenous knowledge was viewed as outdated and irrelevant (Cassidy et al. 2011). Another challenge that was identified was the loss of institutional knowledge due to restructuring and human leakages (Knüppe and Meissner 2016, Mutekwa and Gambiza 2016). Besides the lack of experts, there is little evidence of bottom-up and top-down knowledge-sharing in most articles.

2.3.5 Equitability: challenges related to inclusive processes and fair outcomes

Governance challenges related to achieving socially equitable environmental governance, specifically multi-actor participation, heterogeneity and fairness, were the second most reported across the 135 articles (Table 2.3). The lack of multi-actor involvement was the most commonly identified equity-related governance challenge. Key factors limiting collective participation in southern Africa were lack of funding, gender inequalities, communication barriers, coordination inconsistencies and racial tensions amongst actors

(Cockburn et al. 2019, Salmoral et al. 2019). For example, a study in South Africa identified racial tension between 'white' and 'black' or 'mixed raced' farmers as a key factor limiting collective participation (Cockburn et al. 2019), highlighting how failure to address historical imbalances can undermine socially equitable environmental governance.

Difficulties in including the views of marginalized actors in decision-making processes were also cited as equity-related governance challenges. Reasons for the marginalization of actors were based on gender, poverty and race. Some studies highlighted that gender inequality caused by social-cultural barriers undermined equitable environmental governance (e.g. Mandara et al. 2017, Adams et al. 2018). In Tanzania, patriarchal culture and scepticism have often impeded women's participation in decision-making (Mandara et al. 2017), and failure to implement socially equitable environmental governance in southern Africa has often created elite capture (a form of corruption where resources are biased to benefit certain individuals or groups within natural resource systems) (e.g. Dyer et al. 2014, Orchard and Stringer 2016, Gwiriri and Bennett 2020) or tyranny of localism, where marginalized groups are excluded (e.g. Zuka 2016, Long et al. 2017). The elite capture can be in two forms: local–local capture and external–local capture. Local to local capture refers to the systemic corruption within a scale while external-local capture refers to systemic corruption across scales. This form of corruption has often resulted in the unfair distribution of resources, whether monetary or of equipment.

Furthermore, laws and policies that ensured environmental governance justice have generally been inadequate in southern Africa. For example, in Malawi, the currently used Water Resource Act of 1969 has not set the scene for good water governance, whereby actors conduct themselves in an accountable, transparent and participative manner (Chiluwe and Nkhata 2014). In addition, there have been inequalities in decision-making, as the minister is not obliged to consult other actors on issues related to water (Chiluwe and Nkhata 2014). Furthermore, policies that address the historical impacts of colonialism, social inequalities and insecure land tenure, were lacking. For example, many studies from South Africa and Namibia highlighted that insecure land tenure is a major constraint on socially equitable

environmental governance and successful conservation (Boudreaux and Nelson 2011, Thondhlana et al. 2011, Bennett 2013).

2.3.6 Responsiveness: challenges related to adaptability and flexibility of the institution

Challenges related to the adaptability and flexibility of institutions, specifically their learning, monitoring capacity, innovation and flexibility, were the least reported in the literature. Only four articles cited weak monitoring systems as a challenge inhibiting effective natural resource management (e.g. Knüppe and Meissner 2016, Milupi et al. 2020). Factors hindering effective monitoring and evaluation were lack of investment in monitoring infrastructure, inconsistent monitoring and exclusion of local communities in monitoring activities. Community exclusion in monitoring activities is evident in Zambia, where monitoring is usually conducted by government departments and a few local community members employed as game scouts (Milupi et al. 2020), thereby limiting cross-sectoral reflection on the social-ecological performance of governance.

Another challenge impeding the adaptability and flexibility of institutions was the lack of long-term relationships and trust amongst actors (Falayi et al. 2020). This is evident in South Africa, where distrust amongst actors inhibited social learning activities. Cundill (2010) and Falayi et al. (2020) identified political rivalries, lack of face-to-face meetings and lack of outside facilitation as barriers that undermined innovation and experimentation. Another complexity that engulfs innovation and experimentation was collaborative fatigue, since it impedes ongoing monitoring and evaluation of projects. Apart from collaborative fatigue, Knüppe and Meissner (2016) identified adaptation challenges to new governance structures as barriers inhibiting experimentation with new ideas. For example, Knüppe and Meissner (2016) found that historically disadvantaged actors had found it difficult to create new knowledge in multi-actor forums because of historical legacies of exclusion.

2.3.7 Robustness: challenges related to functional institutions

Challenges related to functional institutions, specifically structurally connected, legitimate, nested institutions and polycentric systems, were the third most reported among

the 135 articles (Table 2.3). The most commonly cited challenge relating to robust environmental governance was a lack of vertical and horizontal structural connections amongst actors. Reasons behind the inadequacies of vertical and horizontal connections in southern Africa were related to a lack of trust amongst actors, a lack of long-term relationships, a lack of multi-actor collaborative financing and power imbalances (e.g. Bennett et al. 2010, Dyer et al. 2014, Cockburn et al. 2019). The location of meetings has also inhibited vertical and horizontal connections, as highlighted by Dyer et al. (2014) and Cockburn et al. (2019). Actors were less likely to participate in meetings that were far from their homes. Furthermore, inadequacies of horizontal and vertical connections have limited knowledge sharing (Knüppe and Meissner 2016) and diffusion of innovation (Cundill 2010).

Despite shifts towards inclusive governance, decision-making at the lowest and most appropriate administrative level is still suboptimal (Nkhata and Breen 2010, Shinn 2016). Lack of devolution and genuine intent to share power were the most commonly identified challenges inhibiting nested governance (e.g. Nkhata and Breen 2010, Chinangwa et al. 2016). For example, the limited provisions of power given to local communities in Kafue Flats was an indication that power was substantially vested in senior government and project management actors (Nkhata and Breen 2010). Negative feedback loops arising from ineffective nested governance were mistrust, resource management failure, detachment and loss of governance units (e.g. Bennett et al. 2013, Mulale et al. 2014).

Inadequacies of polycentric systems were described in five articles. Elite capture, messy institutional arrangements and power imbalances are evidently the key factors inhibiting institutional legitimacy and polycentric systems in southern Africa (e.g. Komakech and van der Zaag 2013, Falayi et al. 2020). For example, in a study examining the dynamics of multi-actor engagement in South Africa, power imbalances hindered the coherence towards common goals within polycentric systems (Falayi et al. 2020). Additionally, institutional incompatibility between the newly created democratic and the traditional structures was a key barrier that inhibited effective governance (Falayi et al. 2020). This is also evident in Madagascar, where the creation of new institutions has favoured resource capture (Pollini

and Lassoie 2011). Lack of democratic processes was a barrier to selecting new committees in polycentric units (Orchard and Stringer 2016).

2.4 Discussion

This scoping review offers nuanced insights into governance challenges in southern Africa during the period 2010 to 2020. The evidence is that governance challenges emanate from institutions, structures and processes that frame the rules and norms of how actors engage with one another. In other words, governance challenges in southern Africa are closely intertwined and complex. In general, few academic studies mention challenges related to responsive environmental governance arrangements. Rather, scholars provide more insights into challenges relating to the maintenance of system integrity and functioning, equitability and institutional robustness. This shows that scholarly research on natural resource governance and management in southern Africa is skewed towards normative considerations (e.g. recognition, participation, direction and fairness). Identifying different types of governance challenges using the framework of Bennett and Satterfield (2018) has shed more light on the challenges inhibiting effective governance and the understudied governance areas in the region.

Existing research on governance primarily mentions limited capacity, skills and resources to plan and implement governance decisions as key challenges inhibiting natural resource management in southern Africa (e.g. Cundill 2010, Mutekwa and Gambiza 2016, Cockburn et al. 2019). Of these barriers, lack of long-term investment in governance by either government or the private sector has been reinforced as a significant contributing factor (e.g. Chinangwa et al. 2016, Zuka 2016). Lack of funding or funding gaps have affected the ability of governance systems to function. In addition to the limited funding for the governance of natural resources in southern Africa, our review shows that a lack of accountability and transparency is common. In some instances, articles reported that a lack of accountability and transparency often resulted in unclear goals and uncoordinated mandates, showing that governance challenges are 'hydra-headed' (Olagunju et al. 2019). This highlights the need to address foundational elements of good governance in southern Africa to manage natural resources sustainably. We argue that environmental governance is the core element of

sustainable natural resource management and conservation programmes in the region (Archer et al. 2018). Addressing governance challenges related to the maintenance of system integrity and functioning might help prevent and reverse the degradation of ecosystems in the region.

Linked to this, genuine polycentric governance can be one way of enhancing the system integrity and functioning of governance systems (Ostrom 2010). Polycentricity shares many characteristics with theories of multi-level governance and other similar concepts (e.g. network governance and co-management) in that there are acknowledgements of multiple scales of effect and the required balancing act of centralisation versus decentralisation (Schoon et al. 2015). Polycentricity is important because it combines the need for redundancy in promoting resilience with the capacity for experimentation and learning between loosely connected governance authorities at any given level and between levels (Carlisle and Gruby 2019). Moving towards a polycentric governance approach may be important in the case of failure and collapse because the interconnectedness of a system can help facilitate institutional memory and the emergence of new institutional structures (Ostrom 2009). Therefore, this interconnectedness is critical in achieving the effective management of southern African resources (Archer et al. 2018).

This review also revealed that challenges related to socially equitable environmental governance were closely linked to challenges inhibiting the functioning of institutions (robustness). Institutions may play a critical role in influencing socially equitable environmental management. For example, we identified a lack of genuine intent to share power across scales as a core challenge related to equitable and robust environmental governance (e.g. Nkhata and Breen 2010, Chinangwa et al. 2016). Failure to address the core challenge of power and benefit-sharing in southern Africa might negatively affect natural resource conservation in two ways. First, it might limit the maximum number of people involved in conserving natural resources, especially at the landscape level. Second, this might lead to the unfair distribution of the benefits and burdens of conservation. Given the high levels of poverty in sub-Saharan Africa that appear to be deep-rooted and intractable (Bicaba et al. 2017), failure to address challenges of power and benefit-sharing might disrupt

conservation initiatives. One way forward would be early engagement and deliberate support for the development of the individual and collective agency of local-scale actors.

Furthermore, this review identifies two critical gaps in terms of: (1) studies of challenges related to responsive environmental governance; and (2) limited engagement with governance theories. Our review showed that challenges related to responsive environmental governance were the least dominant. The limited number of articles identified in the review is also similar to the trends identified by Potts (2020) in a global review of governance challenges. This might mean that responsive environmental governance challenges are understudied or not considered to be core challenges (Potts 2020). Other understudied areas within southern Africa include social-ecological stewardship, polycentricity, innovation and experimentation. The limited analytical depth of the challenges inhibiting responsive governance might mean that there is inadequate information addressing institutional disturbances. Broadening of scholarly research on adaptive governance (Folke et al. 2005), anticipatory learning (Tschakert and Dietrich 2010), social learning (Reed et al. 2010) and polycentricity (Schoon et al. 2015) is required. To extend empirical insights in southern Africa, greater emphasis is needed on designing research that enables the rigorous assessment of governance objectives and attributes. Theorizing and broadening the scholarly research on governance challenges may be beneficial in providing nuanced insights that may shape natural resource management and conservation initiatives. Furthermore, this may help to contextualize and redefine governance challenges where interventions are being implemented. This will allow actors to make sound judgements and adjustments to natural resource management and conservation models (Bennett and Satterfield 2018).

This review contributes to studies that have focused on governance challenges across multiple governance systems. As such, this review can inform future policy and research directions. In the UN Decade on Ecosystem Restoration, greater emphasis needs to be placed on effective governance in southern Africa to prevent, halt and reverse ecosystem degradation successfully. This requires new forms of environmental governance that enable tenure system reforms, sustainable financing, genuine devolution of power and cross-scale cooperation and coordination (Archer et al. 2018). These factors are closely interlinked;

therefore, governance challenges cannot be resolved without understanding the underlying factors that influence institutions, structures and processes. That said, future research needs to emphasize and focus on transdisciplinary approaches in order to comprehend governance linkages.

2.5 Conclusion

Governance challenges in southern Africa are complex and interconnected. While this review demonstrated that challenges related to effectiveness were dominant, our conclusions cannot be generalized. Our research relied only on English-language peer-reviewed articles, which helped limit the number of articles for analysis, but this might mean that some countries were underrepresented. A detailed analysis based on topic modelling of non-peer-reviewed articles will probably offer additional insights into the questions posed in this scoping review. This review nevertheless marks an essential step in understanding contemporary governance challenges in southern Africa. As we embark on the UN Decade on Ecosystem Restoration, this review has shown that governance challenges continue to limit the capacity of natural resource management systems in the region. Therefore, greater emphasis should be placed on building effective environmental governance systems, and this requires solutions that enable tenure system reforms, sustainable financing, genuine devolution and cross-scale cooperation and coordination. Key to these solutions is the development of sustainable landscape financing mechanisms that will enable governance systems to deliver sustainable outcomes. Apart from building effective governance, there is a greater need for developing and enhancing the individual and collective agency of resource users. This is critical for steering societies towards sustainable outcomes. Lastly, we acknowledge that governance systems in southern Africa will continue to face complex challenges; however, it is necessary to address the challenges highlighted in this review to achieve the majority of the Sustainable Development Goals by 2030 and Africa's Agenda 2063 and to successfully implement sustainable natural resource management.

2.6 References

Adams, E. A., L. Juran, and I. Ajibade. 2018. 'Spaces of Exclusion' in community water governance: A Feminist Political Ecology of gender and participation in Malawi's Urban Water User Associations. *Geoforum* 95:133–142.

Archer, E., L. Dziba, K. J. Mulongoy, M. A. Maoela, M. Walters, R. O. Biggs, M.-C. Cormier Salem, F. Declerck, M. C. Diaw, A. E. Dunham, P. Failler, C. Gordon, K. A. Harhash, R. Kasisi, F. Kizito, W. Nyingi, N. Oguge, B. Osman-Elasha, L. C. Stringer, L. Tito De Morais, A. Assogbadjo, B. N. Egoh, M. W. Halmy, K. Heubach, A. Mensah, L. Pereira, and N. Sitas. 2018. *The regional assessment report on biodiversity and ecosystem services for Africa: summary for policymakers*. IPBES.

Arksey, H., and L. O'Malley. 2005. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology* 8(1):19–32.

Bennett, J., A. Ainslie, and J. Davis. 2010. Fenced in: Common property struggles in the management of communal rangelands in central Eastern Cape Province, South Africa. *Land Use Policy* 27(2):340–350.

Bennett, J., A. Ainslie, and J. Davis. 2013. Contested institutions? Traditional leaders and land access and control in communal areas of Eastern Cape Province, South Africa. *Land Use Policy* 32:27–38.

Bennett, J. E. 2013. Institutions and governance of communal rangelands in South Africa. *African Journal of Range & Forage Science* 30(1–2):77–83.

Bennett, N. J., and T. Satterfield. 2018. Environmental governance: A practical framework to guide design, evaluation, and analysis. *Conservation Letters* 11(6):e12600.

Bicaba, Z., Z. Brixiová, and M. Ncube. 2017. Can Extreme Poverty in Sub-Saharan Africa be Eliminated by 2030? *Journal of African Development* 19(2):93–110.

Biesbroek, R., L. Berrang-Ford, J. D. Ford, A. Tanabe, S. E. Austin, and A. Lesnikowski. 2018. Data, concepts and methods for large-n comparative climate change adaptation policy research: A systematic literature review. *Wiley Interdisciplinary Reviews: Climate Change*:e548.

Bollig, M., and D. A. Menestrey-Schwieger. 2014. Fragmentation, Cooperation and Power: Institutional Dynamics in Natural Resource Governance in North-Western Namibia. *Human Ecology* 42(2):167–181.

Boudreaux, K., and F. Nelson. 2011. Community conservation in Namibia: empowering the poor with property rights. *Economic Affairs* 31(2):17–24.

Burnard, P., P. Gill, K. Stewart, E. Treasure, and B. Chadwick. 2008. Analysing and presenting qualitative data. *British Dental Journal* 204(8):429–432.

Carlisle, K., and R. L. Gruby. 2019. Polycentric Systems of Governance: A Theoretical Model for the Commons. *Policy Studies Journal* 47(4):927–952.

Cassidy, L., J. Wilk, H. Kgathi, H. Bendsen, B. N. Ngwenya, and K. Mosepele. 2011. Indigenous knowledge, livelihoods and government policy in The Okavango Delta, Botswana. Page 375 *Rural Livelihoods, Risk and Political Economy of Access to Natural Resources in the Okavango Delta, Botswana*. Sixth edition. Nova, New York.

Chaffin, B. C., A. S. Garmestani, L. H. Gunderson, M. H. Benson, D. G. Angeler, C. A. (Tony) Arnold, B. Cosens, R. K. Craig, J. B. Ruhl, and C. R. Allen. 2016. Transformative Environmental Governance. *Annual Review of Environment and Resources* 41(1):399–423.

Child, B., and G. Barnes. 2010. The conceptual evolution and practice of community-based natural resource management in southern Africa: past, present and future. *Environmental Conservation* 37(3):283–295.

Chiluwe, Q. W., and B. Nkhata. 2014. Analysis of water governance in Malawi: towards a favourable enabling environment? *Journal of Water, Sanitation and Hygiene for Development* 4(2):313–323.

Chinangwa, L., F. Sinclair, A. S. Pullin, and N. Hockley. 2016. Can co-management of government forest reserves achieve devolution? Evidence from Malawi. *Forests, Trees and Livelihoods* 25(1):41–58.

Cockburn, J., G. Cundill, S. Shackleton, M. Rouget, M. Zwinkels, S. F. (Ancia) Cornelius, L. Metcalfe, and D. Van den Broeck. 2019. Collaborative stewardship in multifunctional landscapes: Toward relational, pluralistic approaches. *Ecology and Society*.

Cundill, G. 2010. Monitoring Social Learning Processes in Adaptive Comanagement: Three Case Studies from South Africa. *Ecology and Society* 15(3).

Dyer, J., L. C. Stringer, A. J. Dougill, J. Leventon, M. Nshimbi, F. Chama, A. Kafwifwi, J. I. Muledi, J.-M. K. Kaumbu, M. Falcao, S. Muhorro, F. Munyemba, G. M. Kalaba, and S. Syampungani. 2014. Assessing participatory practices in community-based natural resource management: Experiences in community engagement from southern Africa. *Journal of Environmental Management* 137:137–145.

Fabricius, C., E. Koch, S. Turner, and H. Magome. 2004. *Rights Resources and Rural Development: Community-based Natural Resource Management in Southern Africa*. Routledge.

Falayi, M., J. Gambiza, and M. Schoon. 2020. Unpacking Changing Multi-Actor and Multi-Level Actor Ties in Transformative Spaces: Insights from a Degraded Landscape, Machubeni, South Africa. *Land* 9(7):227.

Falayi, M., S. E. Shackleton, G. C. Kemp, and C. M. Shackleton. 2019. Changes in household use and sale of locally collected environmental resources over a 15-year period in a rural village, South Africa. *Forests, Trees and Livelihoods* 28(2):90–107.

Folke, C., T. Hahn, P. Olsson, and J. Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30(1):441–473.

Gardner, C. J., G. Cripps, L. P. Day, K. Dewar, C. Gough, S. Peabody, G. Tahindraza, and A. Harris. 2020. A decade and a half of learning from Madagascar's first locally managed marine area. *Conservation Science and Practice* 2(12):e298.

Graham, J., B. Amos, and T. W. Plumptre. 2003. *Governance principles for protected areas in the 21st century*. Institute on Governance, Governance Principles for Protected Areas.

Grant, M. J., and A. Booth. 2009. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal* 26(2):91–108.

Gwiriri, L. C., and J. E. Bennett. 2020. Balancing Democracy with Service Delivery: Power Relations, Politics and Accountability in Cooperatives Supporting Emergent Livestock Farmers in South Africa. *International Journal of the Commons* 14(1):123–138.

Hegga, S., I. Kunamwene, and G. Ziervogel. 2020. Local participation in decentralized water governance: insights from north-central Namibia. *Regional Environmental Change* 20(3):1–12.

Kamuti, T. 2014. The fractured state in the governance of private game farming: the case of KwaZulu-Natal Province, South Africa. *Journal of Contemporary African Studies* 32(2):190–206.

Katikiro, R. E., E. D. Macusi, and K. H. M. Ashoka Deepananda. 2015. Challenges facing local communities in Tanzania in realising locally-managed marine areas. *Marine Policy* 51:220–229.

Knüppe, K., and R. Meissner. 2016. Drivers and barriers towards sustainable water and land management in the Olifants-Doorn Water Management Area, South Africa. *Environmental Development* 20:3–14.

Komakech, H. C., and P. van der Zaag. 2013. Polycentrism and pitfalls: the formation of water users forums in the Kikuletwa catchment, Tanzania. *Water International* 38(3):231–249.

Kozanayi, W., R. Wynberg, and F. Matose. 2014. Customary governance of baobab in eastern Zimbabwe: Impacts of state-led interventions. Page *Governance for Justice and Environmental Sustainability*. Routledge.

Lockwood, M. 2010. Good governance for terrestrial protected areas: A framework, principles and performance outcomes. *Journal of environmental management* 91(3):754–766.

Long, S., P. J. S. Jones, Z. Randriana, and J. Hadj-Hammou. 2017. Governance analysis of a community managed small-scale crab fishery in Madagascar: novel use of an empirical framework. *Marine Policy*:102974.

Long, S., G. Thurlow, P. J. S. Jones, A. Turner, S. M. Randrianantenaina, T. Gammage, J. Savage, and J. R. Ndriamanja. 2019. Critical analysis of the governance of the Sainte Luce Locally Managed Marine Area (LMMA), southeast Madagascar. *Marine Policy*:103691.

Makaya, E., M. Rohse, R. Day, C. Vogel, L. Mehta, L. McEwen, S. Rangecroft, and A. F. Van Loon. 2020. Water governance challenges in rural South Africa: exploring institutional coordination in drought management. *Water Policy* 22(4):519–540.

Mandara, C. G., A. Niehof, and H. V. D. Horst. 2017. Women and rural water management : Token representatives or paving the way to power? *Water Alternatives* 10(1):116–133.

Mehta, L., R. Alba, A. Bolding, K. Denby, B. Derman, T. Hove, E. Manzungu, S. Movik, P. Prabhakaran, and B. van Koppen. 2014. The politics of IWRM in Southern Africa. *International Journal of Water Resources Development* 30(3):528–542.

Milupi, I. D., M. J. Somers, and W. Ferguson. 2020. Inadequate community engagement hamstrings sustainable wildlife resource management in Zambia. *African Journal of Ecology* 58(1):112–122.

Mogomotsi, G. E. J., P. K. Mogomotsi, and K. Mosepele. 2020. Legal aspects of transboundary water management: An analysis of the intergovernmental institutional arrangements in the Okavango River Basin. *Leiden Journal of International Law* 33(2):391–408.

Moswete, N., M. Lenao, and M. T. Stone. 2019. Contextualizing and conceptualizing relationships in natural resources, tourism and community livelihoods. Page *Natural Resources, Tourism and Community Livelihoods in Southern Africa: Challenges of Sustainable Development*. Routledge.

Mulale, K., R. Chanda, J. S. Perkins, L. Magole, R. J. Sebego, J. R. Atlhopheng, W. Mphinyane, and M. S. Reed. 2014. Formal institutions and their role in promoting sustainable land management in Boteti, Botswana. *Land Degradation & Development* 25(1):80–91.

Mutekwa, V. T., and J. Gambiza. 2016. Assessment of governance principles application in forest protected areas: the case of six state forests in western Zimbabwe. *International Forestry Review* 18(4):466–484.

Nkhata, B., and C. Breen. 2010. Performance of community-based natural resource governance for the Kafue Flats (Zambia). *Environmental Conservation* 37(3):296–302.

O'Brien, K. K., H. Colquhoun, D. Levac, L. Baxter, A. C. Tricco, S. Straus, L. Wickerson, A. Nayar, D. Moher, and L. O'Malley. 2016. Advancing scoping study methodology: a web-based survey and consultation of perceptions on terminology, definition and methodological steps. *BMC Health Services Research* 16(1):1–12.

O'Higgins, T., A. Farmer, G. Daskalov, S. Knudsen, and L. Mee. 2014. Achieving good environmental status in the Black Sea: scale mismatches in environmental management. *Ecology and Society* 19(3).

Olagunju, A., G. Thondhlana, J. S. Chilima, A. Sène-Harper, W. R. N. Compaoré, and E. Ohiozebau. 2019. Water governance research in Africa: progress, challenges and an agenda for research and action. *Water International* 44(4):382–407.

Olsson, P., C. Folke, and T. Hahn. 2004. Social-ecological transformation for ecosystem management: the development of adaptive co-management of a wetland landscape in southern Sweden. *Ecology and society* 9(4).

Orchard, S. E., and L. C. Stringer. 2016. *Challenges to polycentric governance of an international development project tackling land degradation in Swaziland*. Pages 796–807. Report, Springer.

Ostrom, E. 1994. *The meaning of American federalism.* Institute for contemporary studies Press., San Francisco, CA.

Ostrom, E. 2009. *Understanding Institutional Diversity*. Princeton University Press.

Ostrom, E. 2010. Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change* 20(4):550–557.

Paavola, J. 2007. Institutions and environmental governance: A reconceptualization. *Ecological Economics* 63(1):93–103.

Pahl-Wostl, C. 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change* 19(3):354–365.

Peters, M. D. J., C. M. Godfrey, H. Khalil, P. McInerney, D. Parker, and C. B. Soares. 2015. Guidance for conducting systematic scoping reviews. *JBI Evidence Implementation* 13(3):141–146.

Pollini, J., and J. P. Lassoie. 2011. Trapping Farmer Communities Within Global Environmental Regimes: The Case of the GELOSE Legislation in Madagascar. *Society & Natural Resources* 24(8):814–830.

Potts, R. 2020. Disconnected dots?: A systematic review of governance challenges for natural resource management. *Journal of Environmental Planning and Management* 63(8):1356–1374.

Reed, M., A. C. Evely, G. Cundill, I. R. A. Fazey, J. Glass, A. Laing, J. Newig, B. Parrish, C. Prell, C. Raymond, and L. Stringer. 2010. What is social learning? *Ecology and Society* 15(4): r1.

Salmoral, G., N. C. E. Schaap, J. Walschebauer, and A. Alhajaj. 2019. Water diplomacy and nexus governance in a transboundary context: In the search for complementarities. *Science of The Total Environment* 690:85–96.

Sardeshpande, M., and C. Shackleton. 2020. Urban foraging: Land management policy, perspectives, and potential. *PLOS ONE* 15(4):e0230693.

Scholes, R., L. Montanarella, A. Brainich, N. Barger, B. ten Brink, M. Cantele, B. Erasmus, J. Fisher, T. Gardner, and T. G. Holland. 2018. Summary for Policymakers of the Thematic assessment Report on Land Degradation and Restoration of the Intergovernmental

Science-Policy Platform on Biodiversity and Ecosystem Services. *IPBES Secretariat: Bonn, Germany*:1–31.

Schoon, M. 2013. Governance in Transboundary Conservation: How Institutional Structure and Path Dependence Matter. *Conservation and Society* 11(4):420.

Schoon, M. L., M. D. Robards, C. L. Meek, and V. Galaz. 2015. Principle 7 – Promote polycentric governance systems. *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems*:226–250.

Shackleton, S., B. Campbell, H. Lotz-Sisitka, and C. Shackleton. 2008. Links between the Local Trade in Natural Products, Livelihoods and Poverty Alleviation in a Semi-arid Region of South Africa. *World Development* 36(3):505–526.

Shinn, J. E. 2016. Adaptive environmental governance of changing social-ecological systems: Empirical insights from the Okavango Delta, Botswana. *Global Environmental Change* 40:50–59.

Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney, and C. Ludwig. 2015. The trajectory of the Anthropocene: The Great Acceleration: *The Anthropocene Review*.

Stone, M. T., M. Lenao, and N. Moswete. 2019. *Natural Resources, Tourism and Community Livelihoods in Southern Africa: Challenges of Sustainable Development*. Routledge.

Thondhlana, G., G. Cundill, and T. Kepe. 2016. Co-Management, Land Rights, and Conflicts Around South Africa's Silaka Nature Reserve. *Society & Natural Resources* 29(4):403–417.

Thondhlana, G., S. Shackleton, and J. Blignaut. 2015. Local institutions, actors, and natural resource governance in Kgalagadi Transfrontier Park and surrounds, South Africa. *Land Use Policy* 47:121–129.

Thondhlana, G., S. Shackleton, and E. Muchapondwa. 2011. Kgalagadi Transfrontier Park and its land claimants: a pre- and post-land claim conservation and development history. *Environmental Research Letters* 6(1):1–12.

Tschakert, P., and K. A. Dietrich. 2010. Anticipatory Learning for Climate Change Adaptation and Resilience. *Ecology and Society* 15(2).

Vincent, K., and G. Cundill. 2021. The evolution of empirical adaptation research in the global South from 2010 to 2020. *Climate and Development* 0(0):1–14.

Waffenschmidt, S., M. Knelangen, W. Sieben, S. Bühn, and D. Pieper. 2019. Single screening versus conventional double screening for study selection in systematic reviews: a methodological systematic review. *BMC Medical Research Methodology* 19(1):132.

Wiederkehr, C., A. Berghöfer, and K. Otsuki. 2019. Ostrom's Governance Principles and Sustainable Financing of Fish Reserves. *Human Ecology* 47(1):13–25.

Zuka, S. P. 2016. Contesting Institutional Engineering for Decentralized Natural Resource Governance in Malawi: *SAGE Open*.

Chapter 3: 'The ghost of environmental history': Analysing the evolving governance of communal rangeland resources in Machubeni, South Africa

This chapter is in press as: Falayi M, Gambiza J, Schoon M. 'The ghost of environmental history': Analysing the evolving governance of the Machubeni landscape in South Africa. **Accepted: in-press**: People and Nature. Article DOI: 10.1002/PAN3.10323

Abstract

The need to effectively govern and manage communal rangeland resources has become more important over the past two decades, given the extent of biodiversity loss caused by a myriad of drivers interacting at different scales. Using in-depth interviews, participant observations, and historical information from organisational records, we analysed the application of governance objectives between 1947 and 2017 and their corresponding rangeland condition outcome in Machubeni (South Africa) communal lands. The results show that while the application of governance objectives varied through time, there has been a steady degradation of local rangeland resources since apartheid, due to internal and external drivers of change. This reveals a disconnection between management and resource conditions, suggesting that a return to effective governance alone will not necessarily result in improved rangeland condition in Machubeni, but that more radical steps such as prolonged periods of resting, reseeding and building individual and group agency, are needed. These findings can help practitioners working in post-colonial territories to design effective rangeland management models.

Keywords: agency; environmental challenges; effective governance; environmental governance; grazing management; rangeland resources

3.1 Introduction

Over the past three decades, there has been a growing realisation that communal rangelands are experiencing massive transformation (Shackleton and Gambiza 2008, Palmer and Bennett 2013, Mairomi and Kimengsi 2021), due to the myriad of drivers interacting at different scales (Bennett and Barrett 2007). Environmental challenges such as increased soil erosion, increases in bush encroachment, climate change and variability have been widely reported to be affecting communal rangeland conditions across Africa (Palmer and Bennett 2013, Bolo et al. 2019). Furthermore, high overgrazing, population growth, unsustainable land management and weak institutional arrangements have also been identified as key drivers causing rangeland degradation (Bolo et al. 2019, Mani et al. 2021). In this context and throughout, drivers of change refer to natural or anthropogenic factors that can cause direct or indirect changes to a socio-ecological system (Díaz et al. 2015).

Given the high degree of variability of environmental challenges and the complex nature of drivers of change, research attention is increasingly being given to the design of effective pastoral resource governance systems (Robinson 2019). Governance refers to the ordering of relationships between people and groups of people through institutions, structures and processes (Ostrom 1994). The overarching aim of rangeland governance is to manage the collective actions of resource users and resource user groups, in the pursuit of achieving effective resource management. However, many studies show that effective rangeland governance and management remains a key challenge in communal areas, due to numerous factors (Bennett 2013, Robinson 2019); for example, rangeland governance and management in South Africa is characterised by a long history of direct state interference (de Wet 1987, Hoffman and Rohde 2007, Bennett 2013). The legacy of direct state interventions is not unique to South Africa; it is found in most post-colonial territories (see Abel and Blaikie 1989).

The historical legacy of direct state interference in rangeland governance and management in South Africa is unique because of the scale and time taken to implement policies (Bennett et al. 2010). Through the Natives Act of 1913 and 1936, rangeland in communal areas were established as ‘native reserves’ (Bennett 2013) and common pool grazing was subjected to direct state intervention (de Wet 1987). Here, the state controlled

who held the land and how the land was managed (Yawitch 1988). As a result, the Native Land Act No. 27 of 1913 set aside land that was exclusively designated for Africans (Bundy 1979, Ainslie 1998). These designated areas only covered 13% of the total land area in South Africa, exclusively occupied by black people, who constituted over 80% of the total population (Yawitch 1988). This social engineering increased the pressure on rangeland resources and other natural resources. For example, the loss of pastoral mobility led to overgrazing in the 'native reserves' (Cundill 2008).

By 1932, the Native Economic Commission (NEC) reported severe natural resource degradation in the native reserves due to human population growth and poor rangeland management strategies (Bundy 1979). The state responded by instigating rehabilitation and conservation schemes. Some of the programs included soil and water conservation measures, livestock culling and rotational grazing (Cundill 2008). The imposition of these conservation measures, especially livestock culling, resulted in conflicts between the state and the Africans. Thus the Tomlinson Commission of 1955 recommended that the 'native reserves' population be divided into small farms as a way of containing the ecological challenges of land degradation and overgrazing. It is from this premise that the policy of Betterment Planning was adopted.

The Betterment Planning of 1958 is another example of government-imposed social engineering (Bennett et al. 2010). The purpose of the Betterment Planning was to improve land use and management in reserves. The rangeland management remained top-down, with traditional leaders accountable to the apartheid government through the Bantu Authorities Act. Land-use divisions (rangeland, residential and arable land) by means of fencing were introduced (de Wet 1987). Teague et al. (1981) show that Betterment Planning was rigorously enforced in Ciskei. Little data is available on the degree of planning in the Transkei region. Historical records show strict imposition of fines for people who broke the laws, particularly in the Ciskei region (Bundy 1979, Ainslie 1998). Penalties were imposed for breaking land use management strategies. For example, cattle were impounded if found outside the allocated grazing camp. Another important feature under the Betterment Planning was rotational grazing, which followed a 'one herd-four camp system' (Bennett and Barrett 2007). This

system involved resting one grazing camp for an entire year while the other three were rotationally grazed (Forbes and Trollope 1991). While Betterment Planning emerged as a response to ecosystem degradation, it also resulted in the forced removals and relocation of Africans. This further resulted in overcrowding, with some African households resorting to squatting as a result of not being allocated any land (Wotshela 2001).

Post-1994, the apartheid policies were redressed under new 'inclusive' democratic principles; however, increasing inequality and poverty continued. While there have been recent efforts towards co-management initiatives in communal areas in South Africa, rangeland governance and management continues to be a challenge in former homeland areas (see Bennett et al. 2010, Bennett 2013, Gwiriri and Bennett 2020). Despite the growing research on rangeland governance and management across the globe (Bennett and Barrett 2007, Gwiriri and Bennett 2020), few studies recognise the historical role of human agency in current environmental governance strategies and associated environmental challenges. Thus, a clearer understanding is needed of how agency and structure interact, given the ongoing alarming rates of rangeland degradation in Africa (Archer et al. 2018).

We argue that most environmental challenges originate from governance failures (Pahl-Wostl and Patterson 2021). From this premise, we argue that 'the ghost' of environmental history lingers in current natural resource governance attempts. Therefore, current governance challenges in rural southern Africa are connected to the 'ghost' of environmental history. This article argues that 'history matters' when analysing the evolution of communal rangelands in rural southern Africa. This paper aims to evaluate the application of environmental governance objectives and their consequential impacts on rangeland conditions over 70 years in Machubeni, South Africa. We reason that if we are to understand the interactions between governance and rangeland condition into the future, we need to unpack how historical and contemporary drivers and other changes have shaped the dynamics of environment governance (specific structures, institutions and processes) and their combined relationships with rangeland degradation and larger-scale interactions (policies and legislation). Without such an understanding, we believe it would be difficult to develop governance structures that are better aligned with local needs (Falayi 2017).

Our study seeks to contribute to a few past studies that have used historical lenses to explain the relationship over time between evolving governance dynamics, large-scale interactions (legislation or policy) and rangeland condition (see Mutekwa and Gambiza 2016, Morrison 2017). The governance history for this study was divided into five key periods: (a) customary governance period (pre-1947); (b) apartheid period (1948-1993); (c) new-dispensation period (1994-2005, advent of inclusive democracy); (d) Rural Livelihood Support Programme (RULIV) period (2005-2010); and (e) post-RULIV (2011-2017). The governance history presented in this study is important in three ways. First, our research offers in-depth insights into the adoption and application of environmental governance objectives and attributes under each set of governance arrangements at a specific historical period. Second, this study offers an in-depth analysis of the impacts of environmental governance on rangeland conditions over five different time intervals that broadly correspond to different dominating drivers of change (see Geist and Lambin 2002). This empirical analysis is important because it considers the influences and limitations of drivers of change on different temporal scales and time intervals in Machubeni. Lastly, our analysis offers key insights that can help restructure the current and future governance arrangements. To unpack the main objective of this paper, the specific research questions are as follows:

1. How were the governance objectives and attributes applied per historical period, and what were the influencing drivers?
2. What key drivers influenced rangeland condition over time in Machubeni?

3.2 Study area

This study was conducted in five villages (Helushe, Boomplaas, Platkop, Qhoboshane and Gxojeni) in Machubeni communal lands in the Eastern Cape, South Africa (Figure 3.1).

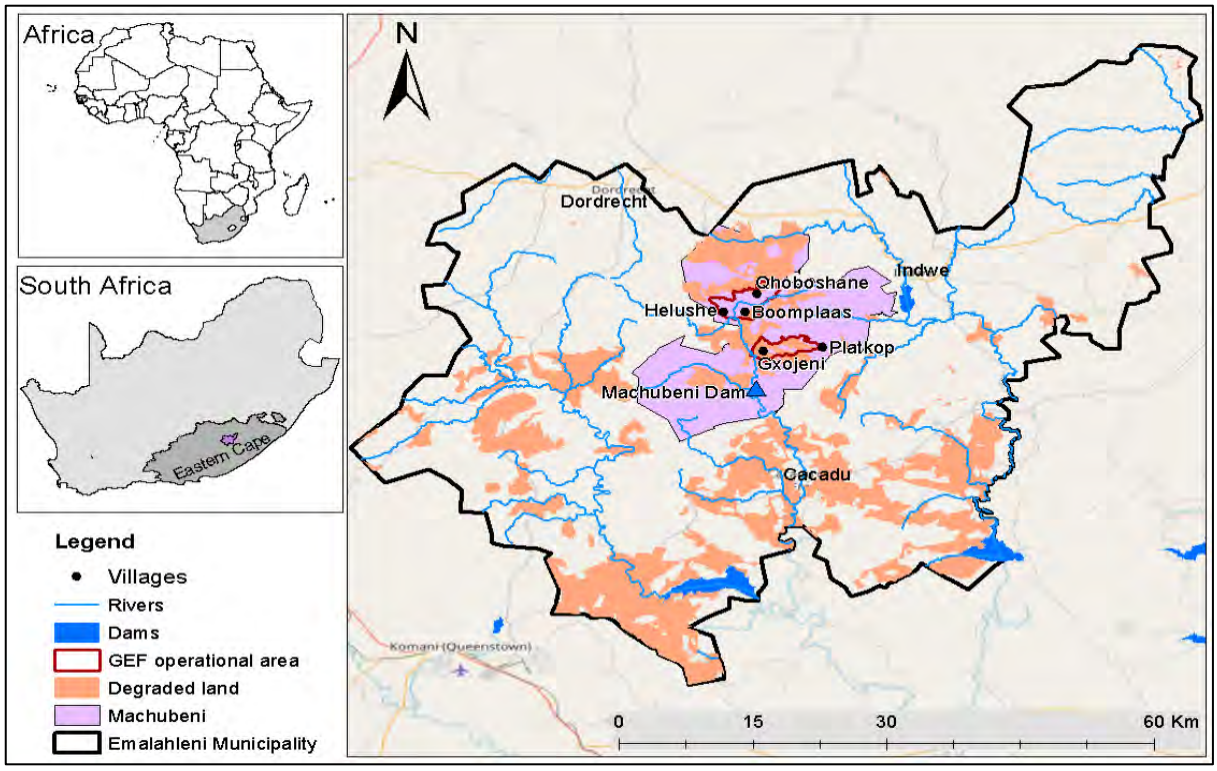


Figure 3.1 The location of Machubeni, Eastern Cape, South Africa

Machubeni communal lands comprise 17 villages (Falayi et al. 2020), home to 16 700 people, who are mainly composed of isiXhosa speaking people (Stats SA. 2011). The area is socially vulnerable, with a 46.3% overall unemployment rate and a 55.3% youth unemployment rate (Stats SA. 2011). This accounts for the 90.5 (number of dependents aged zero to 14 and over the age of 65) dependency ratio documented in the 2016 community survey. Machubeni communal lands fall under the former Transkei homeland. During the Transkei homeland period, direct state intervention significantly affected Machubeni communal lands, which resulted in tenure insecurity and top-down governance structures (Cundill 2008). Machubeni communal lands were subjected to Betterment Planning during the late 1950s. This involved fencing to separate the residential areas, grazing lands, and arable fields (Cundill 2008). It is reported that Betterment Planning led to the consolidation of villages, and those living in the mountains were greatly affected as they were forced to move without consultation. Due to the unavailability of historical land-use planning reports for Machubeni, oral tradition suggests that the grazing management systems were enforced to a greater extent during the apartheid period because of strict imposition of fines. The grazing management system was largely controlled by the traditional leaders and the

livestock owners. However, in the late 1980s it was reported that the fencing that demarcated land-use zones was stolen three times by the local community members. This led to confusion over land use management. During this period, the traditional leaders and livestock owners had lost control over the governance and management of the rangeland.

This interaction and feedback between institutions and resource users is ideal material for use in a historical analysis, with the aim of better understanding environmental governance and management. Post-1994, most households rely on government welfare grants, livestock farming or remittance for cash (Cundill 2008). In particular, ninety-five percent of the households receive government welfare grants per month. Ineffective governance structures characterise the Machubeni landscape (Cundill 2008). The rangeland is characterised by *Sporobolus africanus* and *Eliounurus maticus* grasses, which are less palatable (Zondani et al. 2021), and woody shrubs such as *Euryops floribundus* (Lapesi) have increased over time, thus changing the plant species composition in Machubeni (Shackleton and Gambiza 2008). Furthermore, gully and sheet erosion are common in the area due to reduced vegetation cover, and this state makes Machubeni one of the most degraded landscapes in South Africa (Hoffman and Todd 2000).

During 2005-2010, numerous co-management projects were initiated in Machubeni to reverse the process of land degradation, and to design a model for rangeland governance and management. One of the key projects was the Rural Livelihood Support Programme (RULIV), and a total of ZAR 7 604 598 or USD 1 118 223 was invested in the landscape (Cundill 2008). The project's main objectives were to a) initiate co-management bodies; b) institute rotational grazing and (c) eradicate *Euryops floribundus* within the range. Such interventions are ideal in tracking drivers that influence governance and rangeland condition.

3.3 Methods

This study employed a range of research methods such as life history interviews, a structured governance survey, semi-structured interviews, historical timelines and archival research, to evaluate how governance objectives and attributes were applied per historical period, and the influencing drivers. Furthermore, structured rangeland condition surveys

were employed to identify drivers that influenced rangeland condition over time (Table 3.1). Data collection was conducted over 24 months between late 2018 and early 2020, using a five-step data collection process:

- Structured governance survey
- Structured rangeland condition survey
- Life history and semi-structured interviews
- Participatory Learning and Action (PLA) workshops (timelines)
- Archival research (secondary data analysis)

Table 3.1 Description of the methodological approach

Step	Methods	Variables	Outcome
1	Structured governance survey	Objectives, attributes, elements, institutions, structures, and processes of environmental governance	Application of governance objectives and attributes
2	Structured rangeland condition survey	Species richness and diversity	Rangeland condition
3	Life history and semi-structured interviews	Objectives, attributes, elements, institutions, structures, and processes of environmental governance	Application of governance objectives and attributes and rangeland condition
4	Participatory Learning and Action (PLA) workshops	Drivers of change	Understand the chronological events (drivers) that influenced environmental governance and

			rangeland condition and develop a timeline.
5	Archival research (secondary data analysis)	Drivers of change	Understand historical and contemporary drivers and changes that have influenced governance systems and rangeland condition in Machubeni.

The research applied the practical framework for evaluating the objectives, attributes and elements of environmental governance developed by Bennett and Satterfield (2018), to analyse the data collected in this research (Figure 3.2).

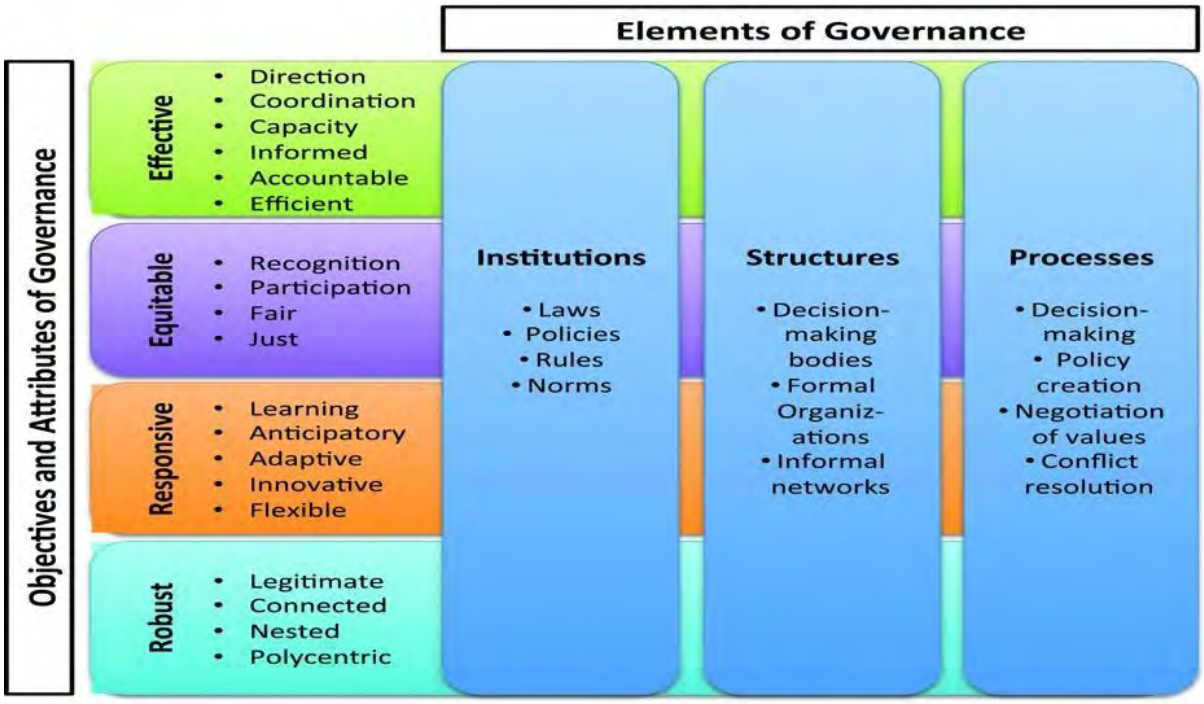


Figure 3.2 A practical framework for evaluating the objectives, attributes and elements of environmental governance adapted from Bennett and Satterfield (2018)

Step one involved assessing how the governance objectives were applied per historical period and the influencing drivers shaping the capacity of natural resource governance systems. Based on the framework by Bennett and Satterfield (2018), we developed a structured governance survey that asked questions relating to the four key objectives and 19 attributes (Figure 3.2). The structured governance survey was administered to 110 actors from different sectors and levels (Table 3.2).

Table 3.2 Demographic breakdown of survey respondents

Demographic	Category	Number of participants
Gender	Female	63
	Male	47
Age group	30-39	17
	40-49	29
	50-59	31
	60 and over	33
Actor level	Local-level	101
	Municipality level	6
	District municipality level	1
	Provincial level	2

We interviewed adults whose ages ranged from 30 years to 70 years to gain a long-term perspective of the environmental governance dynamics in Machubeni (see Appendix 6, Bennett and Satterfield 2018). Adults within the 50 to 70 years age group were specifically interviewed in order to gain the historical perspectives of governance dynamics. At the same time, those below the age of 40 gave perspectives of contemporary governance dynamics. The governance history was divided into five main periods based on interviewees' memory: customary governance period (pre-1947), apartheid period (1948-1993), new-dispensation period (1994-2005), Rural Livelihood Support Programme (RULIV) (2005-2010) and post-RULIV project (2011-2017). The interviewees were asked to measure the level of application

of governance objectives and attributes per historical period using a 5-point Likert test (Table 3.3).

Questions relating to the application of governance objectives and attributes per historical period were measured on a scale of 0-4, ranging from 0=very poor to 4=very good (Table 3.3). Using a structured survey, step two involved assessing rangeland condition and identifying influencing drivers over time (Table 3.1). Again, on the rangeland condition, interviewees were asked to evaluate rangeland condition (i.e. species richness and diversity) over time using a 4-point Likert scale (see Mutekwa and Gambiza 2016). This approach of utilising structured surveys to assess rangeland condition is increasingly being used by sustainability scientists and ecologists across the globe (see Huntington 2000, Kgosikoma et al. 2012, Mutekwa and Gambiza 2016). Understanding rangeland condition through Traditional Ecological Knowledge (TEK) research is important because it can lead to a better understanding of the impacts of various drivers on natural resources (see Babai and Molnár 2014) and the effects of historical legacies - 'the ghost of environmental history' - on modern-day ecosystems.

Table 3.3 Summary of scales used to test the application of environmental governance objectives and rangeland condition

Application of governance attributes	Rangeland condition
0-Very low	1-Extremely degraded
1- Poor	2-Very degraded
2- Satisfactory	3-Moderately degraded
3- Good	4-Not at all degraded
4- Very good	

Since the structured surveys (governance and rangeland condition) measured people's perceptions towards environmental governance and rangeland condition over time, our data were subjected to a reliability test using Cronbach coefficient alpha (Armitage et al. 2018). Reliability ratings were within the acceptable range of 0.78 for environmental governance application and 0.76 for rangeland condition.

Step three involved life history and semi-structured interviews (see Appendix 7). Snowball sampling was used to select life history and semi-structured interviewees. Life histories of eight actors aged 60 years and above were re-constructed to help create a clear picture of the structural changes that took place in Machubeni between the 1940s and 1993 (Antoni et al. 2019). The eight actors were chosen based on their experience of land governance and management in Machubeni and comprised four women and four men who were born pre-1947. Apart from life interviews with senior citizens, we purposely interviewed 40 key actors; these included eight traditional leaders, one local ward councillor, eight middle-aged citizens, eight youths and fifteen government agents who resided in Machubeni. The key informants were chosen based on their experience in natural resource management and governance issues in the area.

In addition to data collected through life histories and semi-structured interviews, two Participatory Learning and Action (PLA) workshops were held to create historical timelines (Table 1: Step four). The PLA workshops were composed of 15 key participants. The first PLA workshop was held with land users and the second with key government officials. Historical timelines were used to account for the past events or drivers of change that the interviewees remembered. When a workshop participant mentioned key data, I added it to the timeline. Thus, the PLA workshops enabled us to understand the chronological events (drivers) that influenced environmental governance and rangeland condition. Furthermore, the workshops served as some form of triangulation.

Step five included archival research. Archival research was used to triangulate and explain further the qualitative data obtained from the two PLA workshops. Furthermore, historical reports were used to set out the impacts of Betterment Planning and associated

land policies in the Eastern Cape. We accessed grey literature from Emalahleni municipality and Cory library (housed at Rhodes University); this included community diaries, pamphlets and journal articles (see Bundy 1979, de Wet 1987; 1995, Manona 1995, Ainslie 1998; 1999, Hoffman and Ashwell 2001, ATS/Ikwezi. 2004, Cundill 2008, Bennett et al. 2013, Bennett 2013, Myoyo et al. 2017). Furthermore, we used consultancy reports and maps from the United Nations Developmental Fund-Global Environmental Fund 5 project (UNDP-GEF5) to validate rangeland condition trends that had been identified using Traditional Ecological Knowledge (TEK).

We followed an inductive, iterative and integrative process to analyse data from life history interviews, semi-structured interviews, and workshop notes (Bazeley 2012). Data were coded based on the objectives, attributes and elements of the governance framework (Figure 3.2). We used the NVivo 12-word count tool to identify the dominant themes (Falayi et al. 2020). Ethical research clearance was obtained from the Rhodes University Ethical Standards Committee (Code: 2019-0658-813), and both written and verbal consent was sought. Two-thirds of the actors opted for verbal consent because participants were uncomfortable with written documents.

3.4 Results

3.4.1 Application of governance objectives and elements

Overall, the results show that the application of governance objectives and attributes varied over time due to multiple drivers influencing governance dynamics (Figure 3.3). The following sections provide a narrative assessment and description of the interplay between environmental governance and drivers identified per historical period.

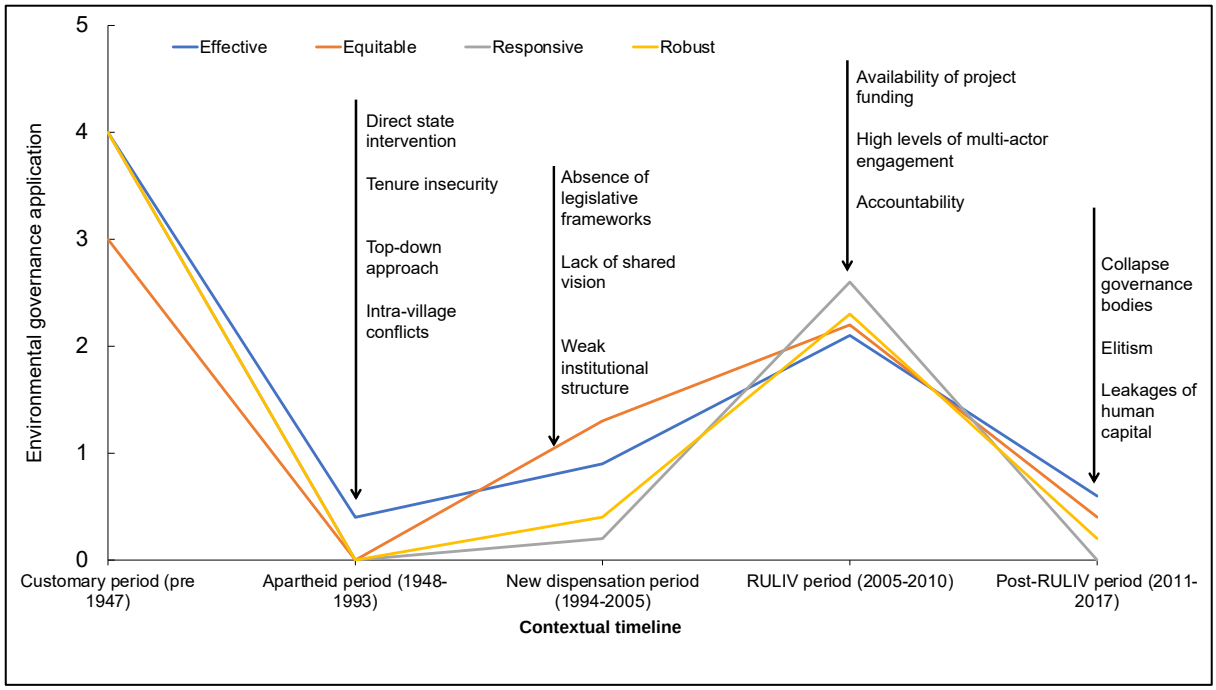


Figure 3.3 Schematic diagram of drivers influencing the application of governance objectives over time. Rating score: 0=very poor; 1=poor; 2=satisfactory; 3=good; 4=very good

Customary governance period: pre-1947

Overall, the application of governance objectives and attributes during the customary governance period was considered to be very good - more than any other period in Machubeni (3.75±0.65). Positive social relations (cited 23 times), high levels of trust (cited 15 times) and social capital (cited 10 times) were identified as key drivers that enabled effective rangeland governance during the customary governance period. Decision-making and coordination were considered optimal because local community members (especially males) played a key role in influencing rangeland governance through the traditional court. One common observation from the interviewee data is that there was a precise mechanism in place to hold traditional structures accountable at the *Nqileni*. *Nqileni* is a traditional court where all males meet once a fortnight. The *Nqileni* was viewed as a governance structure that enforced and implemented the strict rotational grazing management in Machubeni. Furthermore, it is apparent that there was a clear definition of rangeland boundaries and graduated sanctions during this period. For example, one interviewee highlighted that due to

effective governance, there was a strong definition of resource boundaries where grazing of arable land was restricted during the farming season. Furthermore, life-history interviewees indicated that local community members upheld the customary bylaws because rights and obligations were clear.

Despite the application of governance objectives and attributes being considered very good, interviewees (n=8) reported that women were often excluded from environmental decision making (cited 22 times). Patriarchy was identified as a driver that instigated the exclusion of women. Another key highlight was that the governance systems were highly responsive to changing environmental and social conditions (Figure 3.3). For example, the sub-headmen played an important role in monitoring the ecological performance of the veld. This enabled the community to make an informed decision; for instance, during droughts, livestock was allowed to graze in "rested sanctuaries". Here 'rested sanctuaries' are rangeland meant for use during drought seasons. This anticipation and foresight enhanced responsive environmental governance and enabled fair resource distribution and allocation of rangeland. Another key highlight that emerged was that governance units were structurally connected horizontally and vertically because of strong tribal bonds amongst the *AmaGcina* clan (cited 34 times).

Apartheid period: 1948-1993

The results show that the application of the governance objectives and attributes was considered to be very poor during the apartheid period (0.12±0.1) because of numerous drivers such as direct state intervention (cited 123 times), tenure insecurity (cited 101 times), centralised top-down approach (cited 86 times) and intra-village conflicts (cited 43 times). During the late-apartheid period, the governance of the Machubeni rangeland was exclusively based on a centralised top-down approach. The aggressive laws enacted by the Afrikaner-dominated National Party in 1948 meant that the governance system was no longer informed by customary practices (Bundy 1979, Ainslie 1998). Given the direct state intervention through Betterment Planning, the traditional leaders could not make independent decisions concerning the governance of rangeland. The apartheid policies created high levels of

mistrust between the villagers and traditional leaders because the traditional leaders were upwardly accountable to the apartheid state (cited 45 times), which inhibited community members' individual and collective agency (cited 107 times). Archival data also shows that apartheid policies allowed the state to control traditional structures (Manona 1995).

Another example of direct state interventions is the Bantu Homelands Citizenship Act of 1970, which limited the capacity of natural resource user groups to deliver intended outcomes. The apartheid state-run agricultural department based in Lady Frere made key decisions concerning rotational grazing. This meant that the influence of local structures was considered sub-optimal, and the rights of 'blacks' were not observed. However, this led to local-level elitism. Village decision-making was dominated by the village elites (e.g. livestock owners) who had more reliable connections with the apartheid government. It thus created intra-village inequality and further exclusion of women and youths. Some interviewees highlighted that informal patronage groups emerged due to the "divide and rule" policy by the apartheid government. At the same time, the few remaining village rangeland management committees collapsed due to unequal opportunities to influence decision-making (cited 56 times), intra-village conflicts (cited 23 times) and apartheid government influence (cited 47 times). Furthermore, through Betterment Planning, the people of Machubeni lost ownership of their land, resulting in new land-use patterns. The implications of the new land-use patterns meant that the size of the rangeland was reduced, and there was high competition for resources because villages had been consolidated. According to life-history interviewees, the Betterment Planning was largely implemented because the apartheid government wanted to build a dam to supply water to a nearby town. In 1985, the locals were physically removed from the fertile lands to undesirable environments, to make way for the new Machubeni dam.

At the national level, the establishment of the Transkei homelands strengthened the authority of the apartheid government (Cundill 2008). As a result, control and oversight by the national government increased, and the ability of local governance units to make decisions diminished. In addition, Traditional Ecological Knowledge was discarded during Betterment Planning. The failure by the apartheid government to engage locals was

highlighted as one of the drivers that led to poor application of governance objectives and attributes. Thus it became increasingly difficult to implement top-down decisions.

New-dispensation period 1994-2004

The results show that the application of the governance objectives and attributes was considered poor during the new-dispensation period despite the restoration of basic human rights for all (0.7±0.13). Some of the influencing drivers were lack of community vision (cited 133 times), lack of adequate tenure reform (cited 122 times), lack of trust (cited 89 times), and absence of legislative framework protecting people's rights (cited seven times). Interviewees stated that rule enforcement and coordination remained very poor because of a lack of shared collective vision (cited 87 times). Decision-making bodies were reported to be operating in silos because of policy vacuum. Document review shows that it took the new government four years to enact the Municipality Structures Act. The purpose of the Act was to promote effective coordination and enhance efficacy. Interviewee data shows that policy vacuum between 1994 and 1998 gave rise to 'new' governance structures that disregarded traditional leadership. Tensions between democratic structures (e.g. councillors, ward committees and residents' associations) and traditional leaders inhibited decision-making because of the newfound rights emanating from the post-apartheid constitution. While their functioning may have overlapped with the traditional leaders, they were undoubtedly a step forward from the unaccountable institutions of the apartheid period.

While new democratic institutions emerged, document review shows that the governance systems were deeply fragmented (Cundill 2008). Senior government officials highlighted that the governance systems were not robust, and environmental management was shared by almost all departments (Figure 3.3). Environmental management was fragmented between the national, provincial and district spheres of governance. This fragmentation and lack of coordination intensified weak collaboration amongst actors across scales. While the Municipal Structures Act of 1998 was meant to enable effective collaboration and coordination, the views of local pastoralists and farmers were not recognised. The lack of acknowledgement and incorporation of diverse actors enabled unjust

power relations between the municipality and the locals. Further analysis of interviewee data shows that the Municipality commonage bylaws were difficult to enforce because there was a leadership vacuum at the village level. Traditional leaders were disregarded, and the residents' committees had no jurisdiction to enforce the bylaws. Participants also pointed out that post-1994, integrated landscape planning remained noncommittal, with polycentric governance units weakly connected (see Ainslie 1999). For example, an elected councillor would issue land to individuals without consulting traditional leadership. This created power-sharing struggles within Machubeni. Some interviewees suggested that the power- and benefit-sharing mechanisms were deliberately altered to benefit democratic structures as a way of 'punishing' traditional leaders who had collaborated with the apartheid regime. In turn, this created weak governance networks that had little capacity to adapt to change (rangeland degradation).

RULIV period 2005-2010

The results show that the RULIV period was the only period post-1994 that had a somewhat effective governance system (2.03±0.56). Some of the influencing drivers were high levels of engagement (cited 123 times), coordination and collaboration (cited 125 times), availability of funding to support multi-actor engagement (cited 130 times) and accountability (cited 66 times). The RULIV period was based on a co-management approach. Some initiatives included a) creating a multi-actor forum, b) capacity building and c) knowledge networks. As part of the co-management initiative, new resident committees were formed: these included the wool growers association, rangeland management committee, rehabilitation committee and a Section 21 company (refer to section 3.2). The purpose of the rangeland management committee was to institute the one-herd-four-camp system, while the rehabilitation committee was responsible for the eradication of *Euryops floribundus* in the veld and the Section 21 company was the overall management body. The Section 21 company ensured that representation and engagement of different actors were in place. In particular, increased women and youth participation in rangeland governance was brought up in two PLA workshops. Of particular importance, the committees were responsible for conducting environmental monitoring, which informed adaptive environmental governance. This

practice of monitoring and documentation enabled the locals to experiment with new ideas such as restoration of the veld.

Local pastoralists indicated that during the RULIV period, Traditional Ecological Knowledge was recognised, and it played a key role in the formulation of grazing bylaws and demarcation of the rangeland camps. Against this backdrop, the application of governance objectives was moderately satisfactory. Even though the applied sanctions, such as fines, were being reported to exist, the key challenge was that there was no adequate capacity within the community to sanction offenders. Furthermore, the capacity development of leaders through leadership training and conflict resolution played a key role in enabling effective governance. Two-thirds of the interviewees highlighted that availability of external funding played a key role in influencing the application of governance objectives and attributes. External funding enabled the community to organise multi-actor forum meetings, carry out monitoring activities and eradicate the *Euryops floribundus.*

Post-RULIV period 2011-2017

The results show that the application of the governance objectives and attributes was considered to be very poor post-RULIV period (0.3±0.1) because of lack of external funding (cited 133 times), the collapse of the Section 21 company (cited 101 times), leakages of human capital (cited 87 times), corruption and elite power grabs (cited 32 times) and an unclear exit plan by the consultants working under the RULIV project (cited 13 times). Interview data shows that the root cause of these drivers was that the RULIV project had ended. The absence of external facilitators meant that the Section 21 company leaders were the absolute overseers of the co-management activities. Thus, intra-village conflicts and inequalities abounded. This was further exacerbated by the outcome of the local government election, where the new councillor replaced the leadership of the Section 21 company. This led to leakages of human capital, as the trained individuals were replaced by people who had no training. Apart from leakages of human capital, the lack of external financing inhibited effective coordination and capacity training of new members during the post-RULIV period. This led to the collapse of the Section 21 company.

Another perspective is that the local municipality and other government departments did not have the technical capacity to continue collaborative governance initiatives (cited 20 times), and this led to ineffective rangeland governance and management. Moreover, municipal documents show that environmental issues are rarely considered in the economic and social planning of Machubeni landscapes. Furthermore, the absence of a crime-reporting mechanism was said to have led to the violation of the grazing bylaws post-RULIV project (cited 52 times) and the stealing of fencing (cited 23 times). Key informants suggested that some of the key traditional leaders were the individuals who stole the fencing and rehabilitation material—further probing revealed that the traditional leaders felt left out because the leaders of the Section 21 company had alienated them during the RULIV project.

3.4.2 Rangeland condition and perception of change

According to the historical and contemporary ecological knowledge of indigenous pastoralists, the rangeland condition has gradually deteriorated since the customary period Figure 3.4), and this data was corroborated by rangeland condition assessments conducted during 2004 (ATS/Ikwezi. 2004) and 2021 (Zondani et al. 2021).

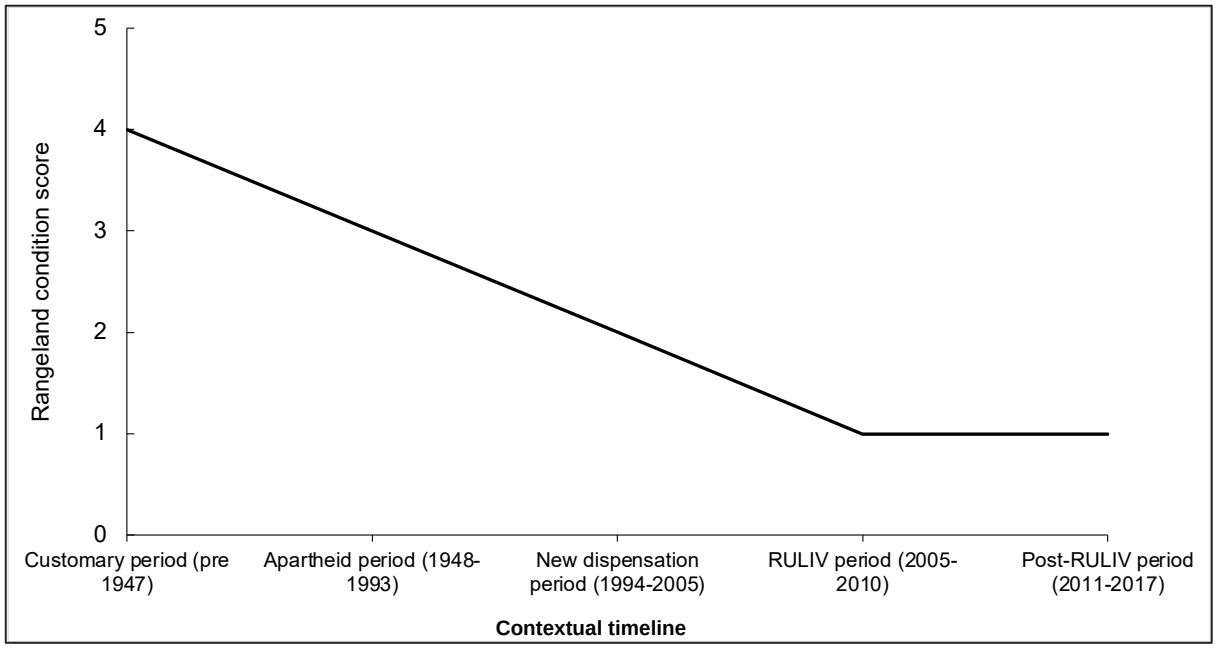


Figure 3.4 Rangeland condition over time; 4=not at all degraded, 3=moderately degraded, 2=very degraded, and 1=extremely degraded

Data obtained through Traditional Ecological Knowledge (TEK) show that the rangeland condition in Machubeni was not degraded during the customary governance period. Livestock owners in Machubeni perceive the reason for this was due to community cohesion/group agency (cited 122 times), effective customary rotational grazing systems (cited 23 times), strong institutions (cited 18 times), clear resource definition (cited 11 times) and availability of range area (cited nine times). Furthermore, livestock owners underscored that resource competition was minimal due to low population levels in the area, and resource monitoring played a key part in guiding resource utilisation because it was based on traditional knowledge. Due to complex social-ecological factors, the overall quality of grazing resources was moderately degraded during the apartheid period. Interviewees suggested that the Betterment Planning of 1958 marked the beginning of rangeland degradation because the availability of range area had reduced and villages had been clustered together, thus creating resource competition. This led to the emergence of *dongas* and *Euryops floribundus* (Shackleton and Gambiza 2008). *Dongas* is a local word that refers to the erosion of gullies within rangelands (Myoyo et al. 2017). Furthermore, the over-arching effect of climate change and climate variability might have driven rangeland degradation (cited three times). Workshop participants identified that between 1947 and 1993, the area experienced

two severe droughts. Thus the increase of temperatures encouraged shrub encroachment, and severe rain caused *dongas*.

By 1980 an estimated 3000 black people lived on Machubeni communal lands. This meant that the population density had increased and with it, the livestock densities. The increase in livestock densities and overstocking were key drivers that exacerbated the degradation of rangeland (cited 106 times). Furthermore, document review shows that the geology of Machubeni is composed of mudstones of the *Tarkastad* Subgroup (Karoo Supergroup), which are highly susceptible to erosion (ATS/Ikwezi. 2004, Mucina and Rutherford 2006). Government soil scientists emphasised that the extensive sheet and gully erosion in the area was largely to blame for the degradation present there. The shallow and stony soils were identified as the driver accelerating rangeland degradation. By the late 1980s it appeared as if there was no central control over rangeland grazing due to low levels of trust and social capital; plus, the locals damaged and stole the rangeland camp fencing.

Post-1994, the pastoralists indicated that there was no clear definition of grazing boundaries, and that the range had become extremely degraded. The identified driving factors for the degradation were lack of available grazing areas, ineffective institutions, intra-village conflicts, increased droughts, and lack of fencing. Despite the effectiveness of the local institutions of natural resource governance during the RULIV period, local rangeland resources continued to degrade. Pastoralists highlighted that the dominance of *Eragrostis plana* and *Aristida congesta* was an indicator that heavy grazing and overstocking had degraded the rangelands, and this collaborates with evidence from veld assessment reports by Zondani et al. (2021). Archival research shows that livestock densities in Machubeni post-2004 are between 300% and 600% above the recommended stocking rate (ATS/Ikwezi. 2004). Surveys conducted in 2003 and 2004 highlighted that the total carrying capacity of large stock units in Machubeni is 1 129 (ATS/Ikwezi. 2004). However, 7 670 LSU were found, signifying heavy over-stocking (ATS/Ikwezi. 2004).

3.5 Discussion

This research draws upon previous works on environmental governance (Lockwood 2010, Bennett 2013, Bennett et al. 2013, Mutekwa and Gambiza 2016). Using the environmental governance framework developed by Bennett and Satterfield (2018), we identified key drivers of change that have influenced the governance and the quality of communal rangeland resources over time. Overall our results mirror the findings of other studies focusing on the communal rangeland resources in post-colonial territories (see Bennett and Barrett 2007, Bennett et al. 2010, Mairomi and Kimengsi 2021). We discuss our key findings below.

Complex Interaction of multi-drivers

Analysing the key drivers over time has enabled us to determine how governance structures and rangeland conditions have been affected by and responded to changes in social, economic, environmental and political drivers (see Bennett 2013, Palmer and Bennett 2013). Throughout the analysis, uneven power dynamics and direct state interventions were identified as key drivers shaping the governance of rangeland resources. The legacy of centralised planning (Betterment Planning) appears to have largely influenced rangeland management and condition and its effects are still visible and widely felt to date - 'the ghost of environmental history'. These findings also mirror other case studies that show that governance and rangeland condition have significantly changed in response to government policies over time (see Sneath 1998, Bennett and Barrett 2007, Hoffman and Rohde 2007). Our analyses reveals that the legacy of centralisation has played a key role in rangeland transformation.

Apart from the legacy of centralisation, the results show that the over-arching effect of climate change has also influenced the modification of rangeland condition through the increase of woody shrubs. Moreover, it was identified that soil structure also plays a key role in exacerbating rangeland degradation. Furthermore, the human factors of growing inequality, lack of viable economic activities and poverty may have indirectly increased the degradation of rangelands. This shows that environmental challenges are complex (Falayi et al. 2021) and systems dynamics play a critical role in determining rangeland transformation

(Geist and Lambin 2002). Given that the Machubeni landscape will continue to be influenced by external and internal drivers of change, it is apparent that 'good governance alone will not necessarily bring about improved rangeland conditions in the short term. Therefore, we argue that adopting Sustainable Land Management practices might help improve the rangeland quality and enhance multi-actor collaboration (see Reed et al. 2015). SLM practices might help tackle rangeland degradation while sustaining people's livelihoods (Reed et al. 2015).

The disconnect between governance, management and rangeland condition

Another key finding is that there has been a steady degradation of local rangeland resources since apartheid, regardless of a brief history of institutional effectiveness during the RULIV period. The complex drivers of change identified in this study can help to explain this disconnect. The increase in human and livestock population might have had a significant impact on the grazing resources since the apartheid period (Stats SA. 2011). Thus the veld condition might have transitioned to a poorer state from which effective rangeland governance and management alone could not have rescued it (Palmer and Bennett 2013). For example, an increase in woody shrubs (Shackleton and Gambiza 2008) and the dominance of *Eragrostis plana* and *Aristida congesta* (Zondani et al. 2021) show that the veld has transitioned to a poorer state. This highlights the need for radical approaches, such as prolonged resting of rangeland or reseeding using native species, as a way of mitigating the continued degradation of rangeland resources in Machubeni.

Opportunities for enhancing the resilience of rangeland resources under communal management in post-colonial territories

Given that communal rangelands in post-colonial territories will continue experiencing transformation due to complex drivers (see Bennett et al. 2010, Palmer and Bennett 2013, Mairomi and Kimengsi 2021), the question now becomes, what key steps can be taken to enhance the resilience of rangeland resources. We acknowledge that there is no straightforward answer to this question. First, our case study depicts the importance of understanding the interaction between structure (governance) and agency in determining

rangeland condition. Although we acknowledge the importance of other drivers such as bush encroachment, climate change, and the increase of carbon dioxide in determining rangeland condition, we argue that it is important to build individual and group agency of actors involved in rangeland governance, considering the effect of disempowerment experienced in post-colonial territories. Thus placing human agency at the centre of rangeland governance and management is key, considering that agency emerges from interaction with history-beliefs, values and perspectives. One way of enabling collective agency is by creating conditions that encourage multi-actor participation, collective problem reframing, learning, experimentation and reflexivity to emerge (Biggs et al. 2015). Such conditions are key in enhancing the resilience of rangeland resources. The aim of building collective agency would be to create an environment for actors to experiment and discover (new) pathways for sustainable managing rangeland resources.

Second, given that communal rangelands face challenges of overgrazing, increased soil erosion and increases in woody species, more emphasis is required on building the capacity for environmental monitoring. Under this conceptual umbrella, the aim is to enhance opportunities for collaborative rangeland monitoring amongst actors across scales, involving IKS and Western science. Therefore, building the monitoring capacity of local actors is key in informing adaptive governance, given the ongoing and overarching effect of climate change. Furthermore, in order to achieve collaborative rangeland monitoring, there is a need to invest in horizontal and vertical knowledge-sharing to inform resource management (see Favretto et al. 2021). Thus, there is a critical need to invest in data management to allow long-term resource monitoring.

Last, given the increase in donor driven co-management initiatives in post-colonial territories, there is a need to invest in sustainable landscape financing after the conclusion of the projects. Our results show that the lack of clear existing strategies by donor-driven co-management initiatives may lead to the total collapse of multi-actor initiatives. Therefore, innovative approaches and policy development is required to support long-term landscape financing. For example, in China, the Natural Forest Protection Program (NFPP) seeks to achieve ecosystem restoration by 2050 (Yang 2017). We argue that long-term financing of

restoration and rehabilitation initiatives is key in enhancing the resilience of rangeland resources in degraded areas.

3.6 Conclusion

The findings from this study support several points alluded to in the introduction regarding the importance of environmental history in deepening our understanding of how human actions have affected the natural environment. This study attempts to show the extended impacts of colonial drivers and the disempowerment of people in natural resource governance. Overall, the results show that the disempowerment of people leads to the degradation of natural resources, and the residual impacts of the colonial drivers - the 'ghost of environmental history' - are evident at the landscape level. Given the continued degradation of natural resources and governance ineffectiveness in post-colonial regions, lessons from transformative and adaptive governance literature can help address and solve some of the extended impacts of colonial drivers. While not advocating a blueprint model for success, transformative and adaptive governance has the potential to actively respond to changes triggered by multiple factors. As highlighted in our study, changes in governance systems and rangelands are complex and non-linear. Therefore transformative and adaptive governance can provide concrete insights for policymakers in working to improve institutional and structural processes of natural resource governance in post-colonial areas.

Furthermore, we argue that multi-actor forums can act as a starting point for enhancing effective governance and instigating institutional change. If properly designed and operationalised, multi-actor forums have the potential to address complex challenges such as colonial injustices and power/resource imbalances, build trust and social capital, and facilitate social learning. As many researchers are now engaged in transdisciplinary transformations research, identifying historical patterns and trajectories of change is important in the current era of rapid global environmental change.

3.7 References

Abel, N. O. J., and P. M. Blaikie. 1989. Land degradation, stocking rates and conservation policies in the communal rangelands of Botswana and Zimbabwe. *Land Degradation & Development* 1(2):101–123.

Ainslie, A. 1998. Managing natural resources in a rural settlement in Peddie district. Master of Social Science, Rhodes University, Makhanda.

Ainslie, A. 1999. When 'community' is not enough: Managing common property natural resources in rural South Africa. *Development Southern Africa* 16(3):375–401.

Antoni, C., E. Huber-Sannwald, H. Reyes Hernández, A. van't Hooft, and M. Schoon. 2019. Socio-ecological dynamics of a tropical agricultural region: Historical analysis of system change and opportunities. *Land Use Policy* 81:346–359.

Archer, E., L. Dziba, K. J. Mulongoy, M. A. Maoela, M. Walters, R. O. Biggs, M.-C. Cormier Salem, F. Declerck, M. C. Diaw, A. E. Dunham, P. Failler, C. Gordon, K. A. Harhash, R. Kasisi, F. Kizito, W. Nyingi, N. Oguge, B. Osman-Elasha, L. C. Stringer, L. Tito De Morais, A. Assogbadjo, B. N. Egoh, M. W. Halmy, K. Heubach, A. Mensah, L. Pereira, and N. Sitas. 2018. *The regional assessment report on biodiversity and ecosystem services for Africa: summary for policymakers*. IPBES.

Armitage, D., A. Dzyundzyak, J. Baird, Ö. Bodin, R. Plummer, and L. Schultz. 2018. An Approach to Assess Learning Conditions, Effects and Outcomes in Environmental Governance. *Environmental Policy and Governance* 28(1):3–14.

ATS/Ikwezi. 2004. Machubeni land use plan assessment report. *Rhodes University* (1):1–56.

Babai, D., and Z. Molnár. 2014. Small-scale traditional management of highly species-rich grasslands in the Carpathians. *Agriculture, Ecosystems & Environment* 182:123–130.

Bazeley, P. 2012. Integrative Analysis Strategies for Mixed Data Sources. *American Behavioral Scientist* 56(6):814–828.

Bennett, J., A. Ainslie, and J. Davis. 2010. Fenced in: Common property struggles in the management of communal rangelands in central Eastern Cape Province, South Africa. *Land Use Policy* 27(2):340–350.

Bennett, J., A. Ainslie, and J. Davis. 2013. Contested institutions? Traditional leaders and land access and control in communal areas of Eastern Cape Province, South Africa. *Land Use Policy* 32:27–38.

Bennett, J., and H. Barrett. 2007. Rangeland as a Common Property Resource: Contrasting Insights from Communal Areas of Central Eastern Cape Province, South Africa. *Human Ecology* 35(1):97–112.

Bennett, J. E. 2013. Institutions and governance of communal rangelands in South Africa. *African Journal of Range & Forage Science* 30(1–2):77–83.

Bennett, N. J., and T. Satterfield. 2018. Environmental governance: A practical framework to guide design, evaluation, and analysis. *Conservation Letters* 11(6):e12600.

Biggs, R., M. Schlüter, and M. L. Schoon, editors. 2015. *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems*. Cambridge University Press, Cambridge.

Bolo, P. O., R. Sommer, J. Kihara, M. Kinyua, S. Nyawira, and A. M. O. Notenbaert. 2019. *Rangeland Degradation: Causes, Consequences, Monitoring Techniques and Remedies*. Working Paper, International Center for Tropical Agriculture.

Bundy, C. 1979. *The Rise and Fall of the South African Peasantry*. University of California Press.

Cundill, G. 2008. Learning, governance and livelihoods: Toward adaptive co-management under resource poor conditions in South Africa. PhD Thesis, Rhodes University, Makhanda.

de Wet, C. 1987. Betterment planning in South Africa: Some thoughts on its history, feasibility and wider policy implications. *Journal of Contemporary African Studies* 6(1–2):85–122.

de Wet, C. J. 1995. Moving together, drifting apart: betterment planning and villagisation in a South African homeland. *Witwatersrand University Press*.

Díaz, S., S. Demissew, J. Carabias, C. Joly, M. Lonsdale, N. Ash, A. Larigauderie, J. R. Adhikari, S. Arico, A. Báldi, A. Bartuska, I. A. Baste, A. Bilgin, E. Brondizio, K. M. Chan, V. E. Figueroa, A. Duraiappah, M. Fischer, R. Hill, T. Koetz, P. Leadley, P. Lyver, G. M. Mace, B. Martin-Lopez, M. Okumura, D. Pacheco, U. Pascual, E. S. Pérez, B. Reyers, E. Roth, O. Saito, R. J. Scholes, N. Sharma, H. Tallis, R. Thaman, R. Watson, T. Yahara, Z. A. Hamid, C. Akosim, Y. Al-Hafedh, R. Allahverdiyev, E. Amankwah, S. T. Asah, Z. Asfaw, G. Bartus, L. A. Brooks, J. Caillaux, G. Dalle, D. Darnaedi, A. Driver, G. Erpul, P. Escobar-Eyzaguirre, P. Failler, A. M. M. Fouda, B. Fu, H. Gundimeda, S. Hashimoto, F. Homer, S. Lavorel, G. Lichtenstein, W. A. Mala, W. Mandivenyi, P. Matczak, C. Mbizvo, M. Mehrdadi, J. P. Metzger, J. B. Mikissa, H. Moller, H. A. Mooney, P. Mumby, H. Nagendra, C. Nesshover, A. A. Oteng-Yeboah, G. Pataki, M. Roué, J. Rubis, M. Schultz, P. Smith, R. Sumaila, K. Takeuchi, S. Thomas, M. Verma, Y. Yeo-Chang, and D. Zlatanova. 2015. The IPBES Conceptual Framework — connecting nature and people. *Current Opinion in Environmental Sustainability* 14:1–16.

Falayi, M. 2017. Understanding social-ecological changes in Fairbairn village, Rhodes University, Eastern Cape. MSc Thesis, Rhodes University, Makhanda.

Falayi, M., J. Gambiza, and M. Schoon. 2020. Unpacking Changing Multi-Actor and Multi-Level Actor Ties in Transformative Spaces: Insights from a Degraded Landscape, Machubeni, South Africa. *Land* 9(7):227.

Falayi, M., J. Gambiza, and M. Schoon. 2021. A scoping review of environmental governance challenges in southern Africa from 2010 to 2020. *Environmental Conservation* 48(4):235–243.

Favretto, N., L. C. Stringer, A. J. Dougill, and L. Kruger. 2021. Knowledge exchange enhances engagement in ecological restoration and rehabilitation initiatives. *Restoration Ecology*:e13565.

Forbes, R. G., and W. S. W. Trollope. 1991. Veld management in the communal areas of Ciskei. *Journal of the Grassland Society of Southern Africa* 8(4):147–152.

Geist, H. J., and E. F. Lambin. 2002. Proximate Causes and Underlying Driving Forces of Tropical Deforestation: Tropical forests are disappearing as the result of many pressures, both local and regional, acting in various combinations in different geographical locations. *BioScience* 52(2):143–150.

Gwiriri, L. C., and J. E. Bennett. 2020. Balancing Democracy with Service Delivery: Power Relations, Politics and Accountability in Cooperatives Supporting Emergent Livestock Farmers in South Africa. *International Journal of the Commons* 14(1):123–138.

Hoffman, M. T., and R. F. Rohde. 2007. From pastoralism to tourism: The historical impact of changing land use practices in Namaqualand. *Journal of Arid Environments* 70(4):641–658.

Hoffman, M. T., and S. Todd. 2000. A national review of land degradation in South Africa: the influence of biophysical and socio-economic factors. *Journal of Southern African Studies* 26(4):743–758.

Hoffman, T., and A. Ashwell. 2001. Nature divided: land degradation in South Africa. *Nature divided: land degradation in South Africa.*

Huntington, H. P. 2000. Using Traditional Ecological Knowledge in Science: Methods and Applications. *Ecological Applications* 10(5):1270–1274.

Kgosikoma, O., W. Mojeremane, and B. A. Harvie. 2012. Pastoralists' Perception and Ecological Knowledge on Savanna Ecosystem Dynamics in Semi-arid Botswana. *Ecology and Society* 17(4).

Lockwood, M. 2010. Good governance for terrestrial protected areas: A framework, principles and performance outcomes. *Journal of environmental management* 91(3):754–766.

Mairomi, H. W., and J. N. Kimengsi. 2021. Governance dynamics in rangelands: An evaluation of the applicability of Ostrom's principles in the Western Highlands of Cameroon. *Scientific African* 12:e00837.

Mani, S., C. P. Osborne, and F. Cleaver. 2021. Land degradation in South Africa: Justice and climate change in tension. *People and Nature* 3(5):978–989.

Manona, C. W. 1995. The collapse of the "tribal authority" system and the rise of civic organisations. *Rhodes University* 1(2):1–36.

Morrison, T. H. 2017. Evolving polycentric governance of the Great Barrier Reef. *Proceedings of the National Academy of Sciences* 114(15): E3013–E3021.

Mucina, L., and M. C. Rutherford. 2006. *The vegetation of South Africa, Lesotho and Swaziland.* South African National Biodiversity Institute.

Mutekwa, V. T., and J. Gambiza. 2016. Assessment of governance principles application in forest protected areas: the case of six state forests in western Zimbabwe. *International Forestry Review* 18(4):466–484.

Myoyo, S., R. Powell, and J. Gambiza. 2017. An assessment of wetlands as a key natural resource in Machubeni communal lands, Eastern Cape. Rhodes University, Makhanda.

Ostrom, E. 1994. *The meaning of American federalism.* Institute for contemporary studies Press., San Francisco, CA.

Pahl-Wostl, C., and J. Patterson. 2021. Commentary: Transformative Change in Governance Systems: A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change* 71:102405.

Palmer, A. R., and J. E. Bennett. 2013. Degradation of communal rangelands in South Africa: towards an improved understanding to inform policy. *African Journal of Range & Forage Science* 30(1–2):57–63.

Reed, M. S., L. C. Stringer, A. J. Dougill, J. S. Perkins, J. R. Atlhopheng, K. Mulale, and N. Favretto. 2015. Reorienting land degradation towards sustainable land management: Linking sustainable livelihoods with ecosystem services in rangeland systems. *Journal of environmental management* 151:472–485.

Robinson, L. 2019. Open property and complex mosaics: Variants in tenure regimes across pastoralist social-ecological systems. *International Journal of the Commons* 13(1):804–826.

Shackleton, C. M., and J. Gambiza. 2008. Social and ecological trade offs in combating land degradation: the case of invasion by a woody shrub (*Euryops floribundus*) at Machubeni, South Africa. *Land degradation & development* 19(4):454–464.

Sneath, D. 1998. State Policy and Pasture Degradation in Inner Asia. *Science* 281(5380):1147–1148.

Stats SA. 2011. Statistics by place, Emalahleni Local Municipality. Pretoria.

Teague, W. R., W. S. W. Trollope, and A. J. Aucamp. 1981. Veld management in the semi-arid bush-grass communities of the Eastern Cape. *Proceedings of the Annual Congresses of the Grassland Society of Southern Africa* 16(1):23–28.

Wotshela, L. E. 2001. Homeland consolidation, resettlement and local politics in the Border and the Ciskei region of the Eastern Cape, South Africa, 1960 to 1996. Ph.D., University of Oxford.

Yang, H. 2017. China's Natural Forest Protection Program: Progress and impacts. *The Forestry Chronicle* 93(02):113–117.

Yawitch, J. 1988. Betterment as state policy in South Africa. In Cross, C.R., and Haines, R. (eds.). Pages 101–111 *Towards Freehold? Options in Land and Development in South Africa's Black Rural*. First edition. Juta, Kenwyn, South Africa.

Zondani, T., C. Chakoma, and S. Myoyo. 2021. *Machubeni rangeland condition status*. Page 16. Veld Assessement, Rhodes University, Makhanda.

Chapter 4: Unpacking changing multi-Actor and multi-Level actor ties in transformative spaces: Insights from a degraded landscape, Machubeni, South Africa

This chapter was published as: Falayi M, Gambiza J, Schoon M. 2021. Unpacking Changing Multi-Actor and Multi-Level Actor Ties in Transformative Spaces: Insights from a Degraded Landscape, Machubeni, South Africa. Land 9:1-16 [online] URL**:**
https://doi.org/10.3390/land9070227

Abstract

The loss of ecosystem services through land degradation continues to be a significant concern for policymakers and land users around the world. Facilitating collective action among various actors is regarded as imperative in halting land degradation. Despite extensive research on collective action, there have been few studies that continuously map social ties and detect network evolution as a way of enabling longitudinal analysis of transformative spaces. This paper seeks to examine the changing dynamics of multi-actor and multi-level actor ties over a period of two years in Machubeni, South Africa. To do this, we used social network analysis to detect continuities and/or discontinuities of multi-actor and multi-level actor ties over time. Overall, edge density, clustering coefficient, and reciprocity scores steadily increased over the two years despite a decline in the number of active organisations within the network. Our results demonstrate that the proportion of strong ties gradually increased over time across three governance networks. However, multi-level linkages between the local municipality and the local organisations remained weak due to a lack of trust and collaborative fatigue. While the transformative space has succeeded in enhancing collaboration and knowledge sharing between local organisations and researchers, further long-term engagement with government agencies might be necessary for promoting institutional transformations and policy outcomes, and building network resilience in complex polycentric governance systems.

Keywords: actors; collaboration; land degradation; learning; social capital; Social Network Analysis; transformative spaces

4.1 Introduction

Contemporary research shows that humanity is facing daunting environmental challenges that are increasingly dynamic and complex (Steffen et al. 2007, 2018). The past century has seen drastic changes in social structures, institutions, relations, and customs. In particular, these changes have defined how societies interact with one another and their ecosystems (Ostrom 2009a, Schoon et al. 2015). Ecosystem services play an important role in supporting human life on earth (Hassan et al. 2005, Díaz et al. 2015, Falayi et al. 2019). Here, we define ecosystem services as benefits that people obtain from ecosystems (Millennium Assessment 2005). These benefits include food, freshwater, timber, natural medicines, climate regulation, and cultural values, amongst many others (Millennium Assessment 2005). Given the importance of the Earth's ecosystems to human well-being, unsustainable resource consumption and waste have forced us into a new planetary era known as the Anthropocene (Steffen et al. 2007). This is not surprising considering that the degradation of ecosystem services through human activities is reported to be negatively impacting the coping capacity of at least 3.2 billion people around the world (Scholes et al. 2018). For example, land degradation decreases the capacity and flow of ecosystem services (Shackleton and Gambiza 2008), thereby undermining people's livelihoods (Reed et al. 2015) and ultimately resulting in livelihood erosion (Shackleton and Luckert 2015). Despite the urgency of addressing accelerated biodiversity loss on both local and regional scales (Hassan et al. 2005), environmental governance continues to be a major challenge (Shackleton and Gambiza 2008, Scholes et al. 2018).

There is general agreement that monocentric governance approaches in addressing environmental problems are inadequate (Milder et al. 2012). This has prompted land users and policymakers to consider multi-actor and multi-level partnerships as a way to combat land degradation (Stringer et al. 2007). Here, multi-actor interactions are described as horizontal connections that link actors across a single organisation level, while multi-level interactions are vertical connections that link actors across multiple organisational levels (Alexander et al. 2015). For this paper, actors are groups or individuals that have a stake, right, or interest in land degradation and land rehabilitation initiatives (Zoumides et al. 2017). These

actors include natural resource users, grassroots organisations (hubs), government agencies, and research institutions.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) reports that land degradation can be addressed through multi-actor participation, and dialogue that recognises the importance of knowledge co-production (Scholes et al. 2018). Multi-actor forums (multi-stakeholder forums) play a pivotal role in bringing together actors from different interest groups to engage in dialogue, share challenges, address complex problems, and develop policy action (Warner 2005). One key principle of multi-actor forums is that they emphasize a democratic approach in reaching decisions (Kusters et al. 2018), thereby providing opportunities for representation of various groups drawn from the public, private, and voluntary sectors (Warner 2005, Faysse 2006). In recent years, multi-actor forums have received much attention from policymakers and resource users for their potential to address many of the "good" governance principles (Kusters et al. 2018). Several studies demonstrate the potential of multi-actor forums to address complex environmental challenges pertaining to climate change (Pinkse and Kolk 2012) and land degradation (Schwilch et al. 2009, Bisaro et al. 2014, Zoumides et al. 2017, Mansourian 2018). In research on land rehabilitation, Zoumides et al. (2017) recommended that the sustainability of land rehabilitation initiatives might be achieved by institutionalising multi-actor forums. Such institutionalisation requires new governance structures that overturn the business-as-usual approaches of collaboration and engagement.

In this context, actors face critical questions of how they can contribute towards social-ecological transformations (Mbow 2020). Here, transformation refers to "fundamental changes in structural, functional, rational and cognitive aspects of socio-technical-ecological systems that lead to new patterns of interactions and outcomes" (Patterson et al. 2017 p. 2). In other words, transformation refers to the process of profound change that leads to new outcomes or patterns (Walker et al. 2004, Westley et al. 2013, Frantzeskaki et al. 2014). Scoones et al. (2020) argued that, in order to achieve the Sustainable Development Goals (SDGs), deliberate normative steering of transformation is necessary at both multi-actor and multi-level scales. Without detailing extensive debates on transformations to sustainability,

this article will focus on the changing dynamics of multi-actor and multi-level ties in transformative spaces.

Transformative spaces are defined as “collaborative environments where actors invested in transformations can experiment with new mental models, ideas, and practices that can help shift Social-Ecological Systems (SES) onto alternative paths” (Pereira et al. 2018 p. 2). It is essential to note that transformative spaces are not transformations, but rather a form of readiness for a system to transform (Stringer et al. 2007). Put simply, transformative spaces act as starting points for institutional change through various groups drawn from the public, private, and voluntary sectors. They engage in dialogue and collaborative learning while reframing issues in a way that allows solutions (Moore et al. 2018, Pereira et al. 2018). In contrast to other participatory research designs that foster multi-actor engagement (Warner 2005), transformative spaces are believed to be a promising stepping stone for SES transformations (Pereira et al. 2019) and may lead to social innovation (Drimie et al. 2018). Here, social innovation is defined as a “process of learning and knowledge creation through which new problems are defined, and new knowledge is developed to solve them” (Lam 2005 p. 124).

It is believed that transformative spaces have the potential to enable systemic changes (Dyer 2018, Moore et al. 2018, Drimie et al. 2018). Here, systemic changes refer to changes that pervade all parts of a system. An example includes the Southern Africa Food Lab case study (Drimie et al. 2018), which illustrates the importance of engaging with multi-actors to respond to systemic challenges. This case study highlights that multi-actor dialogue is a prerequisite for innovative action and for developing new relationships. Other examples include the involvement of marginalised actors within the formal policy dialogues in developing new opportunities for intervention (van Zwanenberg et al. 2018) and the importance of development actors in facilitating meetings that empower women in dealing with cultural barriers (Dyer 2018). Within such collaborative arrangements, researchers do not perform traditional functions of solely being scientific advisors. Instead, they play an active role as “transformative space-makers” (Marshall et al. 2018). In this role, researchers play a pivotal role in selecting and organising social actors in transformative spaces while balancing power dynamics (Pereira et al. 2019).

Another critical aspect is that transformative spaces may enable actors to transform adversarial relations and to foster new ways of working together (Pereira et al. 2019). However, in different circumstances, transformative spaces may 'feel' dangerous (Moore et al. 2018). This is evident in the Food Lab case study where power-related tensions among participants created disgruntlement, thus reducing the safety of others (Drimie et al. 2018). This raises the case of whether transformative spaces are "safe" or "safe enough." Here, "safe" means that transformative change involves learning where actors can freely express their different views (Olsson et al. 2017). In other words, "safe" involves the concept of "learning, unlearning and relearning." We believe that, for a system to transform, changes might need to happen at a personal level first (Pereira et al. 2019). Therefore, understanding how actors interact within transformative spaces is critical for enabling or disabling systemic changes; however, the Monitoring and Evaluation (M&E) of these spaces is often ignored (Pereira et al. 2019).

The problem space

As highlighted in chapter 3, Machubeni is a highly degraded landscape and is characterised by disputes over land management, fragmented governance structures, and a lack of collaboration and coordination between actors across scales. The Machubeni landscape has low levels of social capital. To enhance social capital, in 2018 the Rhodes University GEF5 project team designed the Machubeni transformative space (see Appendix 8). This transformative space is expected to run for four years, until 2022. The transformative space serves as a platform where actors discuss and "freely think, without the weight of disciplinary history or institutional commitments to a given approach that may constrain dialogue, co-create and prepare innovative ideas and innovations" (Pereira et al. 2015 p. 6035). For this paper, the Machubeni transformative space is also known as the Masibambisane multi-actor forum. *Masibambisane* means "let us work together" in the isiXhosa language. It is from within this context that we engaged numerous actors across scales in the process of a transformative space, intending to strengthen the ability of local government structures and rural communities to adopt knowledge-based Sustainable Land Management (SLM), for improved functioning of land and ecosystems that are degraded. The

transformative space seeks to foster a new culture of collaborative learning, develop new partnerships, and promote knowledge-sharing between multi-actors that had previously not been part of any dialogue. The Machubeni multi-actor forum is a space where actors learn while attempting to create new relationships that enable SLM. The specific objectives of the transformative space are to: (a) develop strong social connections among actors across and within scales; (b) create new ideas that enable collaboration and knowledge-sharing; and (c) develop institutions that exhibit good institutional fit and functional redundancy.

Despite an increase in the number of studies that focus on transformative thinking in the Global South, according to our literature search, no studies have managed to track how collaborative ties change over time within these spaces. Understanding the emerging collaborative ties is critical for tracking network evolution, highlighting the emergence of central and weak actors across and within scales, and comprehending system perceptions that may hinder or enable effective collaboration. Here, we contribute to the literature on transformative spaces and collaborative institutions by exploring the network evolution of the Masibambisane multi-actor forum between 2018 and 2020. Our study seeks to fill the gap in knowledge on how changing ties over time influence the flow of information sharing, inter-organisational trust, and views of shared goals within transformative spaces in South Africa. The case study area chosen for this endeavour is regarded as one of the most degraded areas in South Africa (Hoffman and Todd 2000) and has dynamic environmental governance systems (ATS/Ikwezi 2004); therefore, findings may help develop solutions to land degradation issues. By introducing the temporal aspects of how change occurs, we seek to understand the changing dynamics and system perceptions of how actors make decisions within transformative spaces over time.

A social-relational network perspective was applied to identify continuities and/or discontinuities of multi-actor and multi-level connections in the transformative space between 2018 and 2020. Here a social-relational network perspective is defined as a set of actors (institutions or hubs) that are connected by a set of social relationships that enables the flow of information, inter-organisational trust, and views of shared interests.

The specific objectives include: (a) to identify what kind of social-relational connections dominated the transformative space between 2018 and 2020; (b) to identify which actors dominate the transformative space; (c) to examine system perceptions, i.e., barriers and enablers; and (d) to see what strategies can be developed to support the priority needs of the transformative space. This study builds explicitly upon and extends emerging research focusing on transformative spaces as platforms for transformative dialogue, collaboration, and exchange of knowledge between actors that previously did not have dialogues (Drimie et al. 2018, Marshall et al. 2018). This article is organised as follows: in the following section, we outline a brief discussion of the theoretical underpinning; the next section includes a detailed overview of the case study area and an account of the research methods used to answer the key questions; the results section follows, and describes the changing relational pattern of multi-actor ties within the transformative space and actors' perceptions of barriers to effective collaboration and coordination; the paper concludes by discussing the critical implications of the findings.

4.2 Theoretical Background

4.2.1 Linking social capital, polycentrism, and social network analysis

Social capital is used to describe personal relationships within networks that help to build trust, norms of reciprocity, and community participation (Putnam 2000). In other words, social capital is a mechanism by which social relational ties are created among diverse groups, with norms of reciprocity (Dekker and Uslaner 2001). Social ties are composed of several key components: trust, shared norms, information channels, and authority (Coleman 1988). One key advantage of examining social capital is that it provides a holistic approach to understanding how cultural, social, and institutional dynamics of communities affect their capacity for dealing with collective action problems (Ostrom and Ahn 2009). In terms of natural resource governance, social capital is viewed as a critical institutional mechanism that enables collective action and cooperation across scales (Ostrom and Ahn 2009). In that way, social capital is essential to successful collaboration, learning, sharing of knowledge, and developing new ideas (Bodin and Crona 2008). An example includes the Mexico case study (Merino-Pérez 2004), which illustrates that effective social capital can enhance collaboration among different institutions. Most importantly, trust is viewed as a central linkage between

social capital and collective action. Trust is defined as a "particular level of subjective probability with which an actor assesses that another actor will perform a particular action" (Gambeta 1988 p. 217). Put simply, trust enables actors to work together on common issues (Putnam 2000). By establishing common goals and trust processes, actors may have the potential to transform adversarial relations and to foster new ways of working together across scales (Stringer et al. 2006). Drawing from social capital theory, we seek to measure the evolving multi-actor and multi-level ties in polycentric governance systems, i.e., their changing shared beliefs, ties of information-sharing, and inter-organisational trust over time.

Polycentric governance refers to multiple interacting governing authorities across scales with the autonomy to create and implement rules and guidelines within a specific geography (Ostrom 2010, Schoon et al. 2015). Semi-autonomous governing authorities are often described as overlapping, because they are nested at multiple scales (McGinnis and Ostrom 2012). Overlap may facilitate the flow of information among actors or institutions across scales, thereby enabling knowledge co-production and learning (Ostrom 1999). Here, we define scale as an administrative level to which a specific institutional configuration applies (Howitt 2007). Therefore, polycentrism involves a combination of various governing authorities drawn from multiple levels (e.g. local, district, provincial, and national) that are not limited to formal governance bodies (McGinnis and Ostrom 2012). The seminal work by Ostrom (2010) highlighted that the polycentric governance concept is more flexible than a monocentric one in that, if one governance entity fails, others across scales can step in. In this regard, polycentrism attempts to provide more opportunities for different actors across scales to take responsibilities in initiating and implementing sustainable solutions (Morrison et al. 2019). For this paper, we are interested in indigenous resource user groups, government agencies, and research institutions that are involved in land degradation and land rehabilitation discourse. Given the perennial challenges posed by land degradation to people's livelihoods and the environment, polycentrism is therefore required to enhance effective governance systems (Bodin 2017, Schoon and Cox 2018).

Many scholars assert that polycentrism has the potential of enabling collective action in the face of rapid and unpredictable global environmental change (Schoon et al. 2015, Morrison et al. 2019). Thus, polycentric governance systems are essential for three reasons.

First, polycentric systems have a greater capacity to adapt to social-ecological changes than monocentric forms of governance (Folke et al. 2005, Bixler 2014). The advantage of institutional diversity is that it enables cross-scale deliberation and learning, which are processes that enhance the adaptive capacity of governance systems (Ostrom 2009b). By engaging in social learning processes, actors can share information and experiences across scales, while developing new relationships (Pahl-Wostl and Hare 2004). Furthermore, combining both local and scientific knowledge is essential as it produces more relevant results, compared to using only one of these approaches (Reed et al. 2007). The second advantage of polycentricity is that it enables broader levels of participation (Faysse 2006). It enables diverse actors to engage in dialogue and implements actions to problems they hold in common, thereby enhancing institutional fit (Cash et al. 2006). Here, institutional fit refers to a match between an institution and the problem it seeks to address (Young 2008). The third advantage of polycentric governance systems is that they enhance connectivity, modularity, and functional redundancy that can minimise and correct errors in governance systems (Schoon et al. 2015). Given the myriad environmental challenges faced by policymakers and land users, functional redundancy is regarded as necessary when an institutional failure occurs (Ostrom 2012). For example, multi-level governance systems with different political jurisdiction have a higher probability of enhancing connectivity and modularity when governance systems fail or collapse (Galaz et al. 2008). In other words, the existence of multiple institutions at different levels may help mitigate the risk of institutional failure (Low et al. 2003, Schoon et al. 2017).

Social Network Analysis (SNA) is a process commonly used to explore social structures and linkages (Alexander et al. 2015, Schoon et al. 2017, Sardeshpande and Shackleton 2020). SNA provides methods to quantify relations among actors and resultant network structures (Scott and Carrington 2011). In particular, it enables greater understanding beyond the characteristics of individual actors, thereby allowing an in-depth understanding of actor positions and relations, and how these complex ties impact the network structures (Scott and Carrington 2011, Bodin and Prell 2011). As argued by Schoon et al. (2017), SNA is an ideal tool to measure the relational pattern of multi-actor ties, evolution, and the emergence of environmental collaborations over time. Social network literature discusses ways in which actors and groups influence each other (Alexander et al. 2015, Schoon et al. 2017, Lee 2019,

Sardeshpande and Shackleton 2020). For example, actors sharing strong ties tend to influence, trust, and communicate effectively with each other more than those sharing weak ties (Borg et al. 2015). Actors with stronger ties are more likely to enhance mutual learning and sharing of information resources within the network (Borg et al. 2015). Recent studies show that actors who share common values or beliefs communicate easily (Borg et al. 2015). Still, such homogeneity, concentration of power, and resultant threat to 'safety' of space can be problematic as transformation requires different views and opinions across scales and within scales. As highlighted above, social capital is fundamentally about how actors cooperate (Ostrom and Ahn 2009), and this paper focuses on the analysis of social connections in transformative spaces. Given the polycentric relational nature of transformative spaces, SNA offers an approach to study the horizontal (multi-actor) and vertical (multi-level) connections between groups across scales. We focus specifically on measuring the evolving multi-actor and multi-level ties in polycentric governance systems, i.e., their changing shared beliefs, ties of information-sharing, and inter-organisational trust. Furthermore, we assess the barriers to effective collaboration in transformative spaces. In this paper, barriers are obstacles that reduce the effectiveness of collaboration and coordination. Based on our literature review, we offer two hypotheses:

Hypothesis 1 (H1). Transformative spaces will enable broader levels of participation among actors between and within scales (Pereira et al. 2019).

Hypothesis 2 (H2). Strong social-relational linkages (i.e., network ties) will increase over time across and within scales.

4.3 Study area

4.3.1 Overview of Machubeni communal land: setting the scene

The Machubeni communal land (31°30'53.92" S; 27°9'53.49" E) falls within the Emalahleni Local Municipality of the Chris Hani District in the Eastern Cape, South Africa (Figure 4.1).

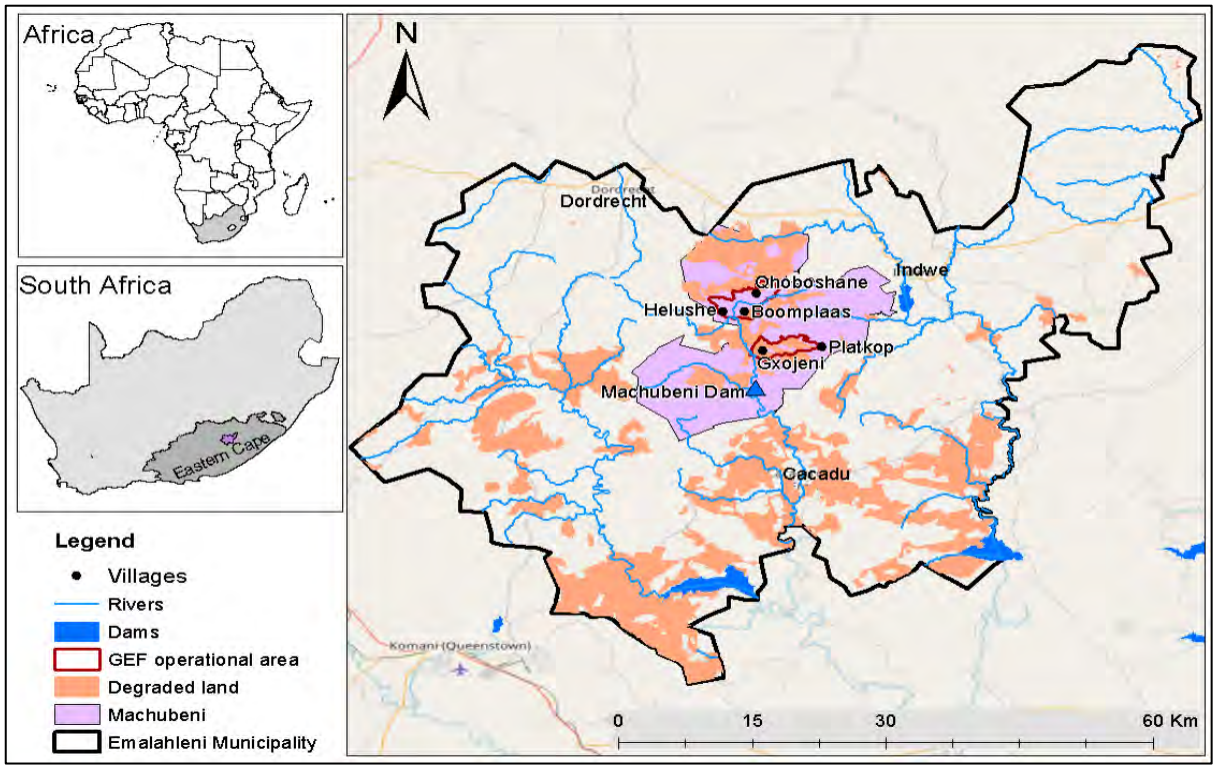


Figure 4.1 Map showing the location of Machubeni communal lands and the Global Environmental Facility (GEF) operational areas

Machubeni also falls within the former Transkei homeland, where land allocation is primarily controlled by both traditional structures and the post-1994 democratic local governance structures, such as the local municipality (ATS/Ikwezi 2004, Shackleton and Gambiza 2008). According to the Emalahleni local municipality, Machubeni is comprised of 13 villages, but the Traditional Leaders Council (TLC) claim that the area is comprised of 17 villages. This contest over ward boundaries was primarily caused by the Municipality Demarcation Board (MDB), which dissolved the spatial layout of the apartheid legacy (Republic of South Africa. 1998a). The Municipal Demarcation Act No. 27 of 1998 enabled the creation of new municipal areas which were non-racial, but in some cases such as Machubeni, it failed to follow complex social boundaries. This escalated conflicts over land management between the traditional authority and the local municipality.

Most households rely on livestock farming, state social grants, and remittance as their primary sources of income. Livestock farming is a crucial livelihood in the area, comprising approximately one-third of the average household's income (Shackleton and Gambiza 2008).

However, overstocking of livestock and weak governance institutions that work in silos have been blamed for the significant soil erosion in the area. Moreover, the culture of collaboration is reported to be ineffective, with little to no sharing of knowledge and learning across actors, sectors, and scales (Republic of South Africa. 1998a, Cundill 2008). In 2004, the Department of Economic Development, Environmental Affairs and Tourism identified Machubeni as one of the most impoverished communities in South Africa (ATS/Ikwezi 2004). The Machubeni community received over ZAR 7 million from Public Works funding under the Sustainable Land-Based Livelihoods programme to improve the agricultural production system and reverse the process of land degradation. Through this program, the community received specialised training and support in land management; however, the program was characterised by distrust and jealousy among project beneficiaries.

The vegetation cover in the region is dominated by *Euryops floribundus* shrub, *Eragrostis trichodes*, and *Eucalyptus saligna* (Mucina and Rutherford 2006). The mean annual rainfall is 590 mm. The underlying geology of the area consists mainly of sandstones and mudstones. The soils are generally stony and shallow, except in the valley bottoms. The hilly slopes and valley bottoms in the region are affected by sheet and gully erosion which, in turn, has affected both crop and livestock farming (Shackleton and Gambiza 2008).

4.4 Approach and methods

4.4.1 Criteria for selecting actors

We identified actors that were involved in SLM or environmental governance, or affected by land degradation in Machubeni, by following a two-part stakeholder identification design proposed by Leventon et al. (2016). Firstly, the Rhodes University team conducted an extensive literature search to identify a) actors who live in the area (e.g. traditional leaders, natural resource user groups, and ward committees) and b) external actors who have an interest in the management and governance of natural resources or work within the specific environment (e.g. researchers and government agencies). Sources of literature identified included research articles (Shackleton and Gambiza 2008, Cundill and Fabricius 2010) and scientific reports (ATS/Ikwezi 2004, Emalahleni Municipal Assessment. 2018). After the extensive review of literature, the research team identified four natural resource user groups

and three departments from the local municipality, district municipality, and the provincial government, respectively. In the second phase, the research team contacted the identified actors. The identified actors were asked to identify other actors who they considered necessary for the transformative space, using a snowball sampling approach (Leventon et al. 2016). Five new natural resource user groups and three local municipality departments were identified. In total, sixteen semi-autonomous institutions were identified in the governance network, representing a range of administrative levels (Figure 4.2).

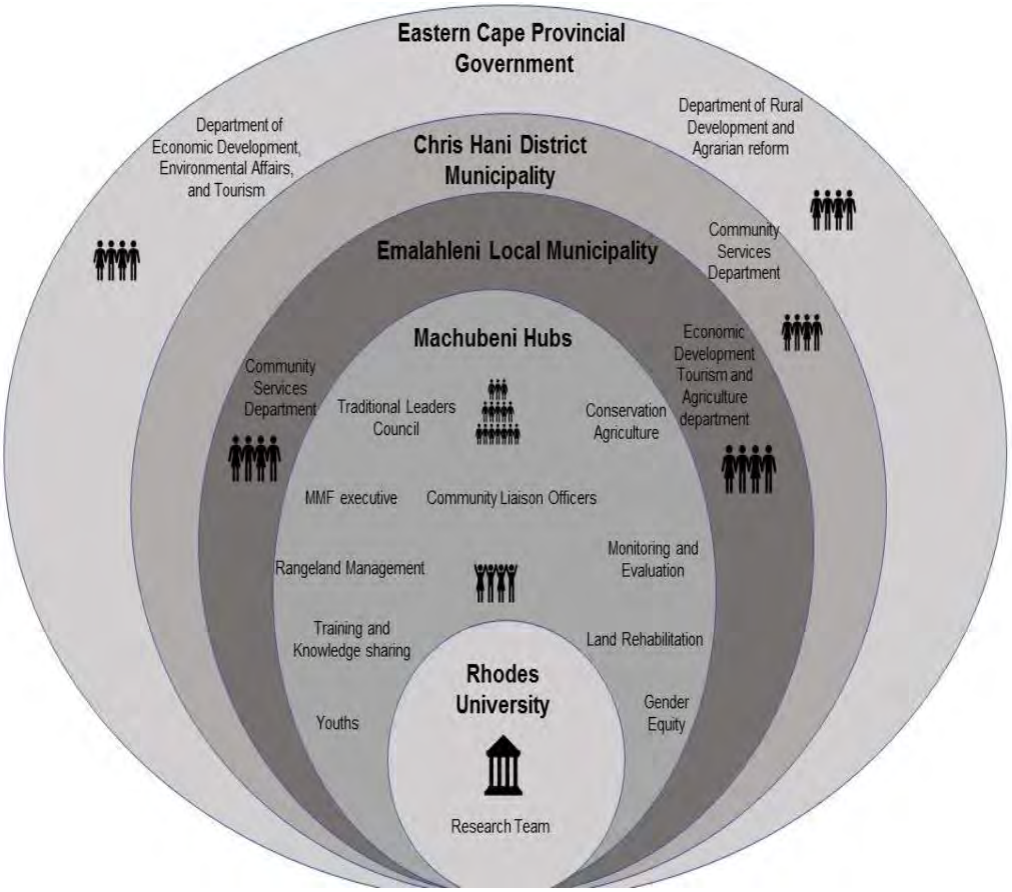


Figure 4.2 Multi-actor and multi-level onion diagram

Participatory Learning and Action (PLA) workshops are regarded as an essential vehicle for enhancing dialogue among actors from different backgrounds and perspectives (Chambers 2012). Therefore, a workshop was held in order to organise the multi-actor forum. In order to achieve the objectives of a transformative space, actors adopted the hub concept.

A hub is a group of actors with similar interests, e.g. livestock farmers. Local actors from Machubeni communal lands were organised into seven SLM groups/hubs based on their interests: conservation agriculture hub (CA); land rehabilitation hub (LR); rangeland management hub (RG); training and knowledge-sharing hub (TKS); M&E hub (ME); gender equity hub (GE); and the youth hub (YH). These groups are semi-autonomous within the governance networks. After organising the seven SLM Hubs, actors organised a transformative space (multi-actor forum) to enhance partnerships, collaborations, knowledge-sharing, transformative institutional change, and mainstreaming of SLM approaches into local government policies. Throughout this paper, the SLM hubs represent local organisations.

4.4.2 Data collection

We used a mixed-methods approach that included a socio-metric survey (Carolan 2013), Participatory Learning and Action workshops (Chambers 2012), and semi-structured interviews and document review. Data for this study were collected from the Rhodes University GEF5 SLM project between March 2018 and March 2020. A social-relational pattern was applied to detect continuities and/or discontinuities of multi-actor and multi-level actor connections in the transformative space between 2018 and 2020 (2 years). The evolution of the Masibambisane multi-actor forum allows us to: (a) detect the changing social-relational connections over time; and (b) identify how and why these patterns change. To examine the changing dynamics of horizontal and vertical multi-actor ties, social network data were collected using a socio-metric survey (Alexander et al. 2017). The socio-metric survey was administered through personal interviews, telephone interviews, and emails with SLM hub members, government representatives, and Rhodes University researchers. Social-metric data were collected in two phases: (a) July 2019 and (b) February 2020; this allowed us to identify the changing social-relational connections over time. The first author collected data with the aid of a translator. Table 4.1 shows the characterisation and distribution of organisational actors across and within scales.

Table 4.1 Characterisation and distribution of organisational actors

Scale	Phase 1: No. of Respondents	Phase 2: No. of Respondents
Research team	13	12
Local hubs	75	71
Local municipality	15	12
District municipality	2	0
Provincial Government	8	8
Total	113	103

Out of 135 actors, 113 managed to complete the socio-metric survey in the first phase. In the repeat survey (phase 2), we interviewed the same actors (n = 103); however, we did not receive responses from the district municipality. This means that our results might be biased towards experiences of more active organisations. The socio-metric survey was divided into three main sections of organisational ties: (a) views of common goals; (b) inter-organisational trust; and (c) information-sharing amongst actors. For analytical purposes, actors were asked to list the organisations they cooperated within their respective networks. Specifically, actors were asked to consider three different types of organisational ties: (a) views of common goals; (b) inter-organisational trust; and (c) information-sharing. Views of common goals are organisational ties concerning mutual interest between and among various organisations within the network. Inter-organisational trust consists of ties concerning the extent to which members of one organisation trust the members of a partner organisation. Information-sharing consists of organisational ties concerning the exchange and sharing, among various organisations, of land degradation and SLM information (e.g. observation of environmental change, rangeland condition, land rehabilitation, invasive species, conservation agriculture, and bylaws.

After identifying active organisations, actors were asked to measure if they shared information with, trusted, or had similar objectives with, the identified organisation. Ties resting on the level of inter-organisational trust, the flow of information amongst organisations, and views of common goals, were measured using a 5-point Likert test. This

process was repeated in the second phase (repeat survey). Semi-structured interviews were used to further explain the changing dynamics emerging from the SNA (Borg et al. 2015). Semi-structured interviews (n = 54) were conducted with SLM hubs, government agencies, and the research team. Four PLA workshops were held to reflect on the outcomes of the SNA and to identify strategies to overcome barriers to effective collaboration and coordination in transformative spaces. Altogether, 50 actors participated in four PLA workshops. Interviews were digitally recorded, and ethical research clearance was obtained from the Rhodes University Ethical Standards Committee (Code: 2019-0658-813). Workshop or attendance registers were used to record and track the regularity of actor participation per workshop. Grey literature accessed from the Emalahleni Municipality was triangulated with socio-metric and semi-structured interview data.

4.4.3 Actor ties analysis

In order to test our two hypotheses, five network metrics were calculated, based on ranked scores elicited directly from participants: in-degree centrality, betweenness centrality, edge density, clustering, and reciprocity. In-degree centrality measures the number of incoming ties received by a node from others (Scott and Carrington 2011). Nodes with high in-degree centrality are considered to be highly connected as they are in contact with many others. Betweenness centrality measures the extent to which a node falls along the shortest path between the various nodes in a network (Scott and Carrington 2011). An actor with the highest betweenness centrality is usually referred to as a gatekeeper or broker (Scott and Carrington 2011). Reciprocity measures the degree of cohesion within networks for example If A identifies B, B also identifies A. While clustering is the average of the densities of the neighbourhoods of all the actors. Put simply, clustering measures “how many of my friends are also friends of themselves” (Schoon et al. 2017 p. 680). Edge density measures the degree to which the transformative space is cohesive. To assess the strength of the inter-organisational ties within the transformative space, ties were categorised as either weak or strong (Alexander et al. 2017). Network data were dichotomised three times. First, all ties, both weak and strong, were combined, and any tie greater than 0 became 1 (Alexander et al. 2017). Second, weak ties were identified as either rarely or occasionally. Here, ties that were equal to 1 and 2 became weak ties. This allowed us to measure and analyse the number of

observed weak ties within and between groups. Third, strong ties were identified as either very often or extremely often (Alexander et al. 2017). Here, ties that were equal to 3 and 4 became strong ties. This then allowed us to measure and analyse the number of observed strong ties within and between groups (Alexander et al. 2017). This process was done for all three networks.

4.4.4 Qualitative analysis

Semi-structured interviews and PLA workshop notes were analysed using manual coding and Nvivo 12 software. Qualitative data analysis followed inductive, iterative, and integrative processes (Bazeley 2012). We open-coded the data to identify key themes related to system perceptions, i.e. barriers and enablers. The wordcount tool found in Nvivo 12 was used to identify dominant keywords (i.e. barriers) emerging from workshop discussions and semi-structured interviews. The merging of SNA and qualitative analysis provided a comprehensive understanding of the changing system perceptions.

4.5 Results

Results from the Machubeni case study are presented here to test our two hypotheses that: a) transformative spaces will enable broader levels of participation among actors between and within scales, and b) strong social-relational linkages (i.e. network ties) will increase over time across and within scales. Results from our two hypotheses will help identify which key barriers and strategies enable effective collaboration and coordination in transformative spaces.

4.5.1 Trends in participation

Figure 4.3A&B shows the trend in the number of actors who attend workshop meetings in Machubeni over time. Our results show that the total number of actors who attended workshop meetings steadily increased between Phase 1 and Phase 2 (Figure 4.3A&B). There was a 134% increase in the total number of actors who attended workshop meetings between Phase 1 and Phase 2 (Figure 4.3A). In total, 58 members—28 local community members, 18 government officials, and 12 researchers—were identified as active members in both phases (Figure 4.3A). Twelve were based at the local municipality, three at

the district level, and six at the province level, indicating that the transformative space was composed of different actors across and within scales (Figure 4.3B).

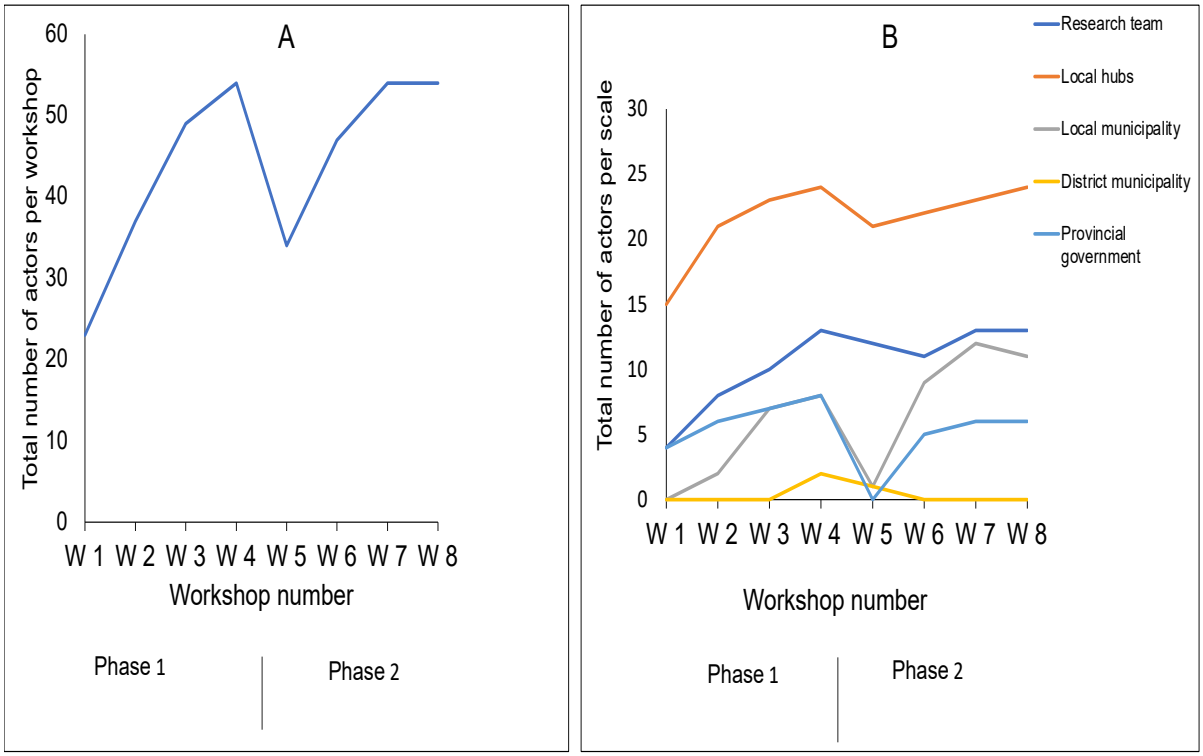


Figure 4.3 Trends and changes in the number of workshop attendees over time. (A) depicts changes in the total number of attendees per workshop and (B) depicts changes in the total number of attendees per scale. W represents workshop.

Network members highlighted that the change of workshop venue led to an increase in attendance (coded 87 times). Provision of transport (coded 89 times) for local hub members to attend workshop meetings was cited as one of the reasons that led to an increase in attendance. Based on interview responses, network members cited environmental reasons for participating in the transformative space, including:

"I joined the transformative space because I would like to help transform the Machubeni landscapes into a better sustainable area. I have realised that land degradation has rapidly increased over the past 60 years. Therefore, its has become a necessity to stop land degradation and bush encroachment which is affecting our livelihoods."

Others cited cross-scale collaboration as a reason for joining the transformative space (coded 71 times):

"I joined the transformative space because I like the idea of working together. Moreover, the workshop allows us to interact and share knowledge with government officials who hardly visit Machubeni."

While the transformative space enabled broader levels of participation in Machubeni, there was a slight decrease in the number of active actors in Phase 2 (Figure 4.3B). Based on workshop attendance data, there was a high turnover of government officials and the youths (Figure 4.3B). In Phase 2, we observed that district municipality staff and the youths stopped attending the workshop meetings (Figure 4.3B). High turnover of network members was identified as a major leakage of human capital (coded 31 times). In terms of youth, the high turnover was due to a disinterest in home gardening and community-based land rehabilitation (coded 24 times).

Further probing revealed that most youth did not aspire to having green jobs. Here, green jobs refer to work related to the conservation of the environment. One youth member suggested that the high turnover was due to the fact that youth anticipated employment opportunities as data enumerators and not as land rehabilitation workers. In some instances, the youths emphasised that the transformative space was not a safe space and their safety was often compromised. As one youth member noted:

"Whenever we make suggestions during forum meetings, the older participants always interject us. However, we cannot argue with the elders in public because this is against our culture."

Interviewer: But the forum is a safe space where all network members are equal?

Respondent: In principle, it is a safe space, but usually after the workshops, we often get a rebuke from the elders for highlighting divergent points to theirs. This resulted in youths keeping quiet during workshop discussions.

"It is better to be safe than sorry."

Out of the 22 government officials identified in Phase 1, 36% represented the public service, while 64% represented the local government. Inclusively, 9% (n = 2) represented senior management, 72% (n = 16) middle management, and 18% (n = 4) junior management. In Phase 2, there was a 12% decline (n = 2) in the number of middle management actors. Middle management actors interviewed related this 12% turnover rate to being overworked within the district (coded 12 times) and collaboration fatigue (coded 19 times). Figure 4.4 depicts the changes in the frequency of attendance by government actors over time. Further analysis revealed that the attendance ratio of senior management actors was highly fluid (Figure 4.4).

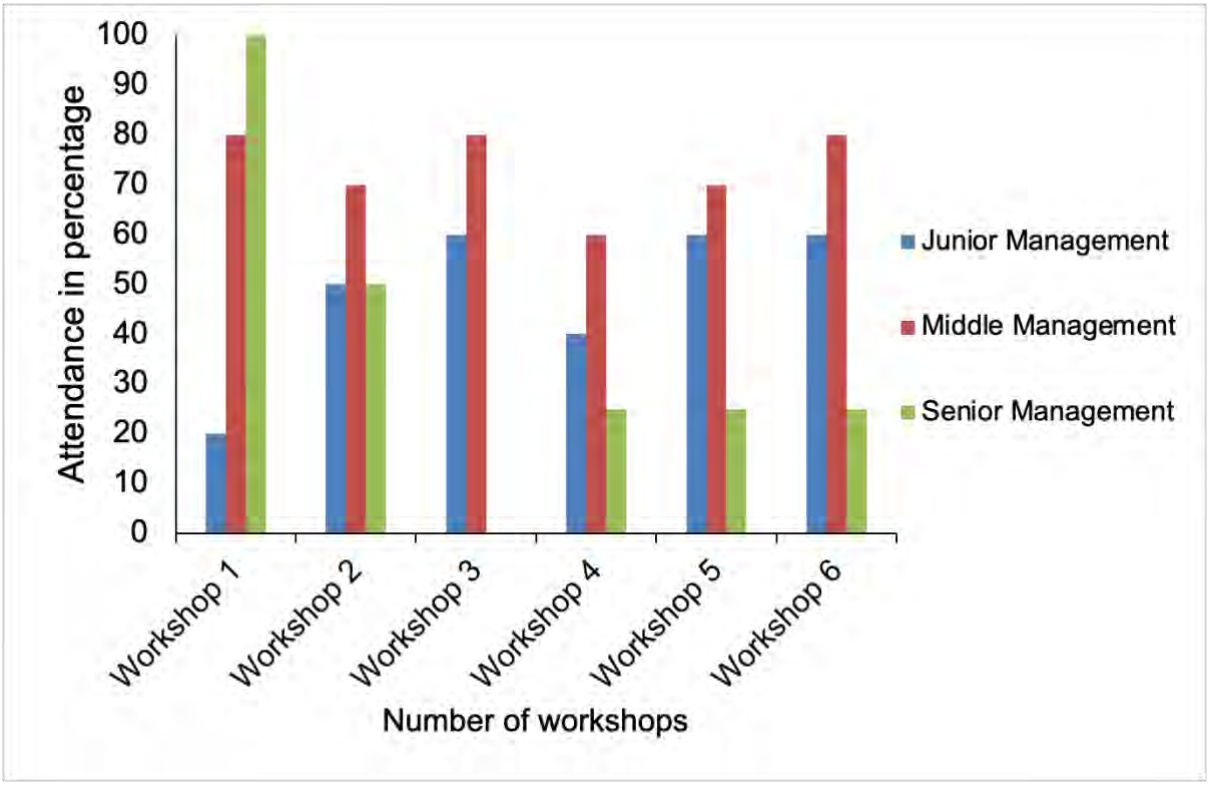


Figure 4.4 Changes in the frequency of attendance by government actors over time

We observed that the frequency of attendance by junior management in 2019 steadily increased from 20% to 80% over two years, and this coincided with the rapid decline of senior management attendance. Based on interview responses, all senior management actors indicated apathy for future collaboration (coded 12 times). As one senior management actor articulated:

…"*When the university finally exits the project in 2022, I do not see any senior government actors from District or Provincial level attending forum meetings because it will be the mandate of the local municipality as an implementer to take over…..Our role at the Provincial level is to help with policy interpretation, but if the local municipality is non-functional there is nothing we can do"…*

Further probing revealed that there were deep structural tensions between the local municipality and the district municipality. One district municipality official highlighted that the Municipal Structure Act of 1998 states that the role of the district municipality is to provide technical assistance to local municipalities, including sharing of specialised capacity. However, local municipality officials emphasised that the idea of shared priorities is an ideal concept on paper, but it is rare in practice, signifying governance mismatches.

Overall, edge density, clustering coefficient, and reciprocity scores steadily increased on average over the two phases, despite a decline in the number of active organisations within the polycentric governance network (Figure 4.5). We observed that the reciprocity score of the inter-organisational trust network increased steeply from 0.33 to 0.85 (Figure 4.5). This might signify an increase in collaborative cohesion among different actors within the polycentric governance network.

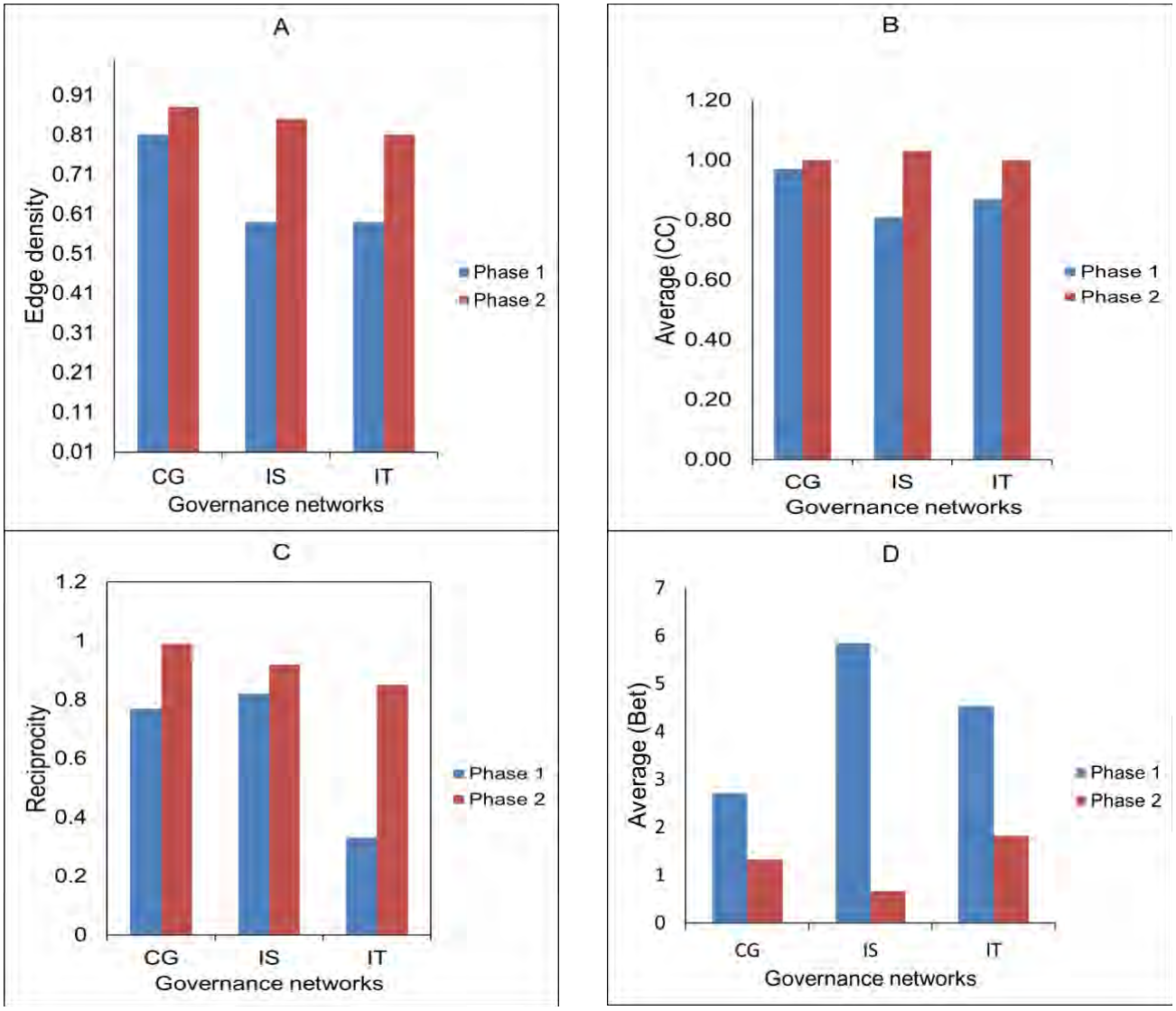


Figure 4.5 Network metrics evolution: (A) depicts changes in edge density; (B) changes in average clustering; (C) changes in reciprocity; and (D) changes in average betweenness. CG (Common Goals network), IS (Information-Sharing network) and IT (Inter-organisational trust network)

Furthermore, 90% of the respondents reported that the transformative space demonstrated strong cohesion e.g.

"The transformative space discussions have enabled us to form new bonds and build strong relationships with other villages and government actors. Furthermore, I have realised that by working together as different villages, government departments and researchers, we

can arrest land degradation because we all bring different strengths. For example, Rhodes University is glueing us together, the government departments are providing technical support, and the community is providing the energy to rehabilitate the land".

The social facilitation process enabled attitudinal changes: network members generated a "together-we-can" mentality. We observed an increase in edge density, as well as clustering and reciprocity within the network (Figure 4.5). The increase of these metrics scores over time suggests that there is an increase in cooperation and knowledge-sharing among different semi-autonomous institutions within the polycentric governance network. While there is an increase in network density, clustering coefficient, and reciprocity(Figure 4.5).

Most importantly, we observed that the overall number of strong ties increased on average, while the number of weak ties decreased over time (Figure 4.6). The changes in the proportion of direct ties observed within respective governance networks in Machubeni ranged widely, with the common goals network having an increase of 6%, information-sharing network 25%, and inter-organisational trust network 33%. Furthermore, the proportion of strong ties steadily increased, with the common goals network having an increase of 66%, information-sharing network 29%, and inter-organisational trust network 17%. In terms of multi-actor ties, strong linkages were prevalent between local–local hubs, while weak vertical ties were prevalent between the local hubs and the local municipality (Figure 4.6). Overall, the proportion of strong ties between the university and the government departments remained stable over time across three networks (Figure 4.6).

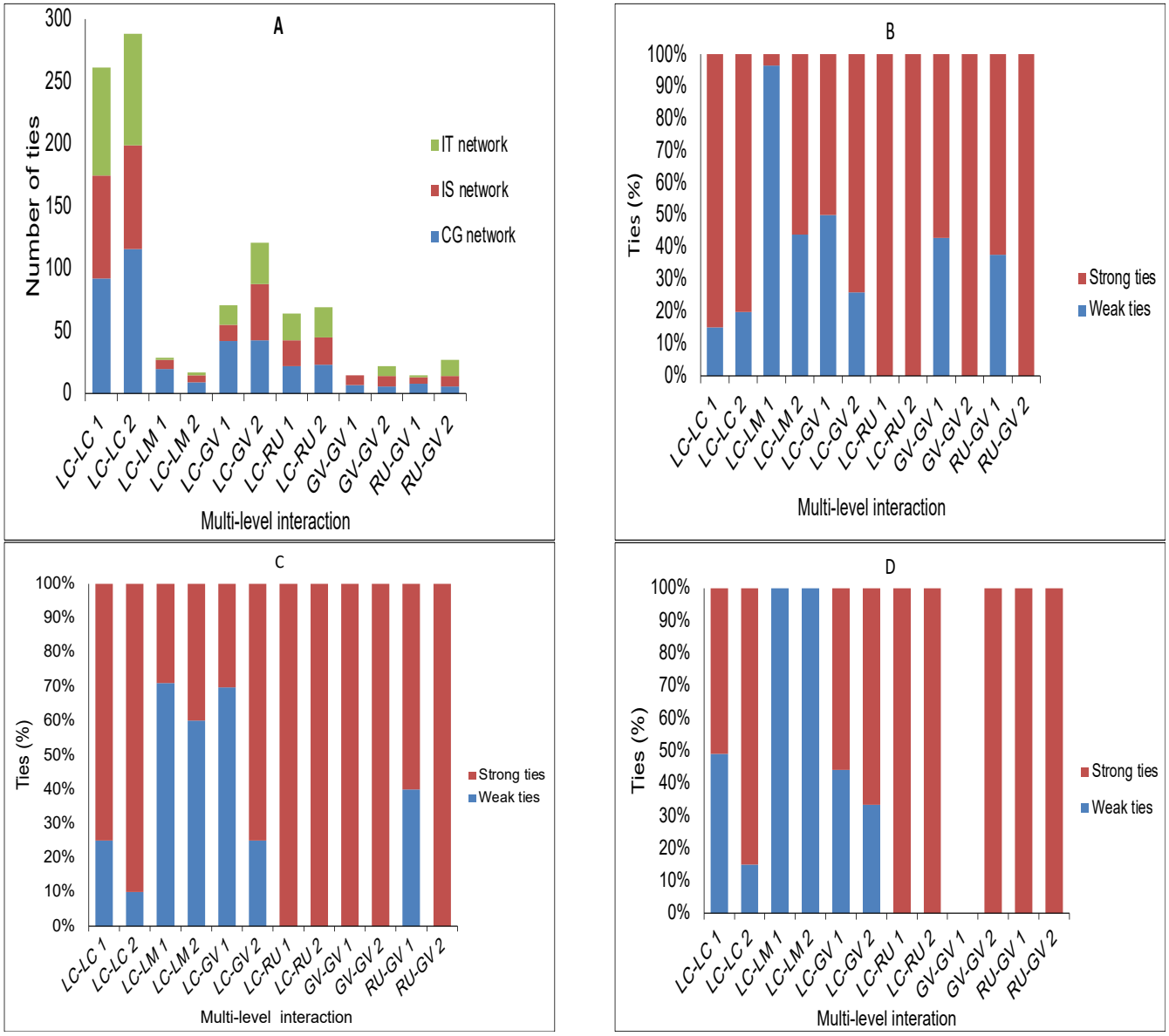


Figure 4.6 Distribution of multi-actor and multi-level ties across three networks. (A) depicts the distribution of ties across three governance networks, i.e. IT (inter-organisational trust network), IS (information-sharing network), and CG (Common goals network) between Phase 1 and Phase 2. (B), (C) and (D) depict the distribution of strong versus weak ties across three governance networks (common goals, information-sharing, and inter-organisational trust networks). LC (Local hubs), LM (Local municipality), GV (Government), RU (Rhodes University)

4.5.2 Evolution and description of the common goals network over time

Our analysis revealed that the distribution of strong ties increased among actors and across scales over time. Semi-structured interviews revealed four processes that contributed to the increase of strong ties among local–local hubs over time. Network members highlighted that enhanced social facilitation (coded 43 times), personal relationships (coded 21 times), behavioural change (coded 13 times), and personal learning (coded nine times) were related to the increase of strong ties within the network over time. Network members elucidated that social facilitation enabled members to develop shared goals, thereby enhancing relational and collective agency. Most importantly, ties among local–local hubs were mostly strong with like-minded organisations such as CA, LR, and RG closely connected in both phases (Figure 4.7) because of personal connections, with one hub leader suggesting that "over the past two years we have enjoyed working together as local organisations, and we have become stronger together."

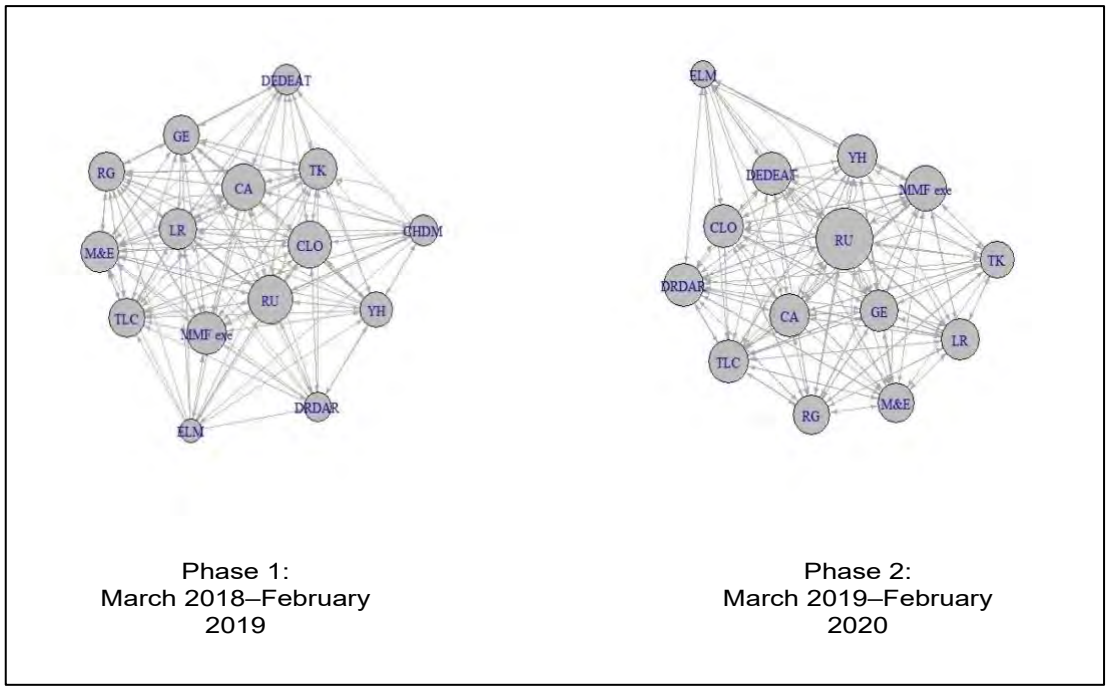


Figure 4.7 Overview of the common goals network. Arrows represent directed, weighted ties and circle size represents degree centrality. Rhodes University (RU), Department of Economic Development, Environmental Affairs, and Tourism (DEDEAT), Department of Rural Development and Agrarian Reform (DRDAR), Chris Hani District Municipality (CHDM),

Emalahleni Local Municipality (ELM), Traditional Leaders Council (TLC), Masibambisane multi-actor forum executive (MMF exe), GEF5 Community liaison officers (CLO), Conservation Agriculture Hub (CA), Land Rehabilitation Hub (LR), Rangeland Management Hub (RG), Training and Knowledge Hub (TK), M&E Hub (M&E), Gender Equity Hub (GE), and Youth Hub (YH).

Our data reveal that the local municipality was the least connected organisation across and within scales in both phases (Figure 4.7). Further probing revealed that municipal officials were hesitant in aligning their goals with the rest of the network because of limited resources for service delivery (coded 13 times) and a lack of clearly outlined rules of engagement between local municipalities and civil society (coded eight times). An ex-municipal employee elucidated that most municipal extension officers who attend the forum meetings were mere 'pen-pushers' with little or no authority to make decisions that enable institutional transformations.

4.5.3 Evolution and description of the information-sharing network over time

Our analysis revealed that the distribution of strong ties increased between actors and across scales over time (Figure 4.6). In Phase 1, we observed that Rhodes University was the most central and dominating actor (Figure 4.8). However, in Phase 2, five organisations were identified as central in the information-sharing network. Based on interview responses, network members linked this to an increase of cross-scale coordination meetings, i.e. Intergovernmental Relations (IGR). Both the Department of Economic Development, Environmental Affairs, and Tourism and the Department of Rural Development and Agrarian Reform were seen as central government agencies that shared technical information within the transformative space. However, network members reported weak ties between local organisations and the local municipality in both phases (Figure 4.8).

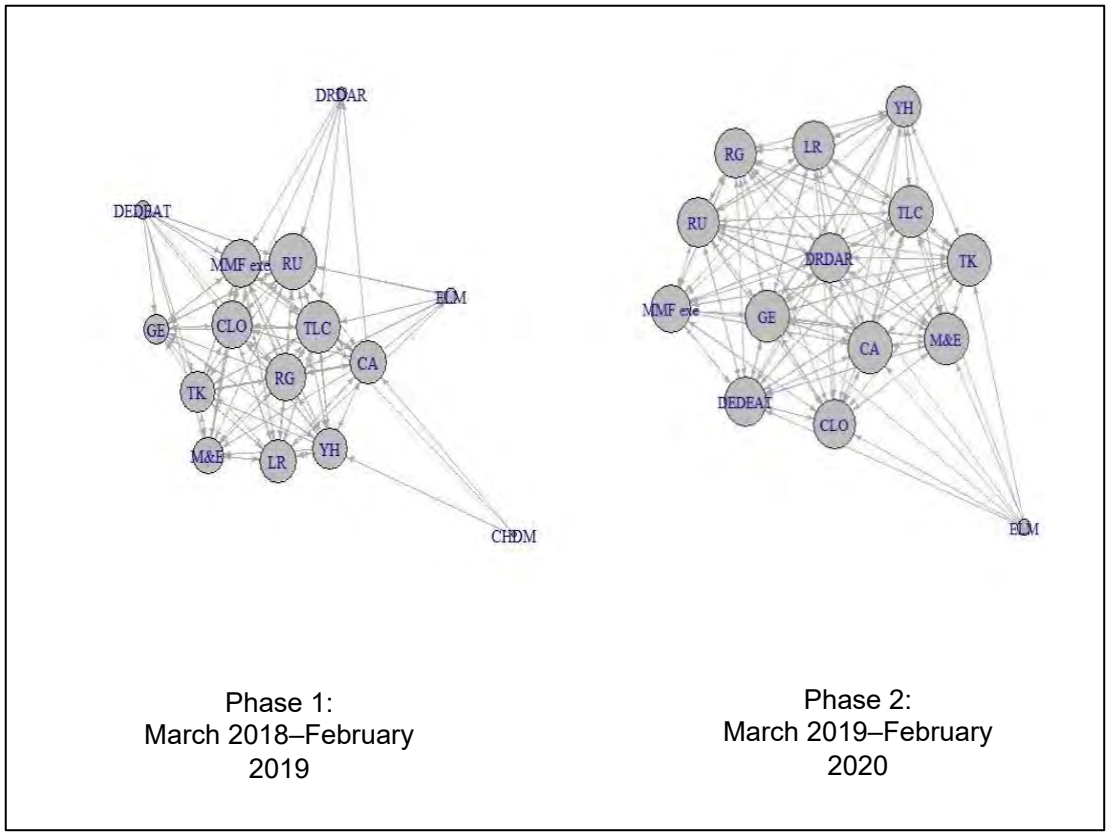


Figure 4.8 Overview of the information-sharing network. Arrows represent directed, weighted ties and circle size represents degree centrality. Rhodes University (RU), Department of Economic Development, Environmental Affairs, and Tourism (DEDEAT), Department of Rural Development and Agrarian Reform (DRDAR), Chris Hani District Municipality (CHDM), Emalahleni Local Municipality (ELM), Traditional Leaders Council (TLC), Masibambisane multi-actor forum executive (MMF exe), GEF5 Community liaison officers (CLO), Conservation Agriculture Hub (CA), Land Rehabilitation Hub (LR), Rangeland Management Hub (RG), Training and Knowledge Hub (TK), M&E Hub (M&E), Gender Equity Hub (GE), and Youth Hub (YH).

Document analysis of grey literature from the Emalahleni municipality revealed that the local municipality did not have adequate scientific information to share with local communities concerning land degradation and rangelands. Further probing revealed that a lack of resource planners at the local municipality level, such as soil scientists, pasture scientists, and natural scientists, created communication barriers. Network members interviewed elucidated that political instability (coded nine times), high-level leadership

instability (coded four times), deep structural tensions (coded eight times), and discontinuous participation by senior municipality officials (coded 48 times) from the local municipality impeded effective communication within the transformative space across scales. Despite most organisations and hubs having some informational ties in both phases, there were no informational ties reported for the district municipality in Phase 2. Two potential explanations for this emerged from interviews with district municipality officials, who highlighted that the participatory process was time-consuming considering that the transformative space focused on five villages within the district. Another reason might be insufficient budgets from the district municipality to fulfil demands of the transformative space, thereby resulting in self-exclusion e.g.

"the district municipality is financially constrained, and we support six local municipalities, it will be difficult to commit to knowledge-sharing activities."

4.5.4 Evolution and description of the inter-organisational trust network over time

Our analysis revealed that the distribution of strong ties increased between actors and across scales over time (Figure 4.6). Figure 4.9 depicts the overview of the Inter-organisational trust network over time. Although there was an increase in strong ties between local–local hubs, mistrust between the Traditional Leaders Council and the MMF executive was becoming more apparent. The MMF executive was accused of "capturing" the project and directing all project benefits to their cronies (coded 34 times). As one of the headmen stated:

"We are the custodians of this community, MMF executive is distributing lucerne seedlings without our blessings. What criteria did they use to distribute the seeds? As the headman, I am the father of the five villages, and I will never let anyone divide my community. Therefore, the selection criteria should include all local semi-autonomous hub leaders."

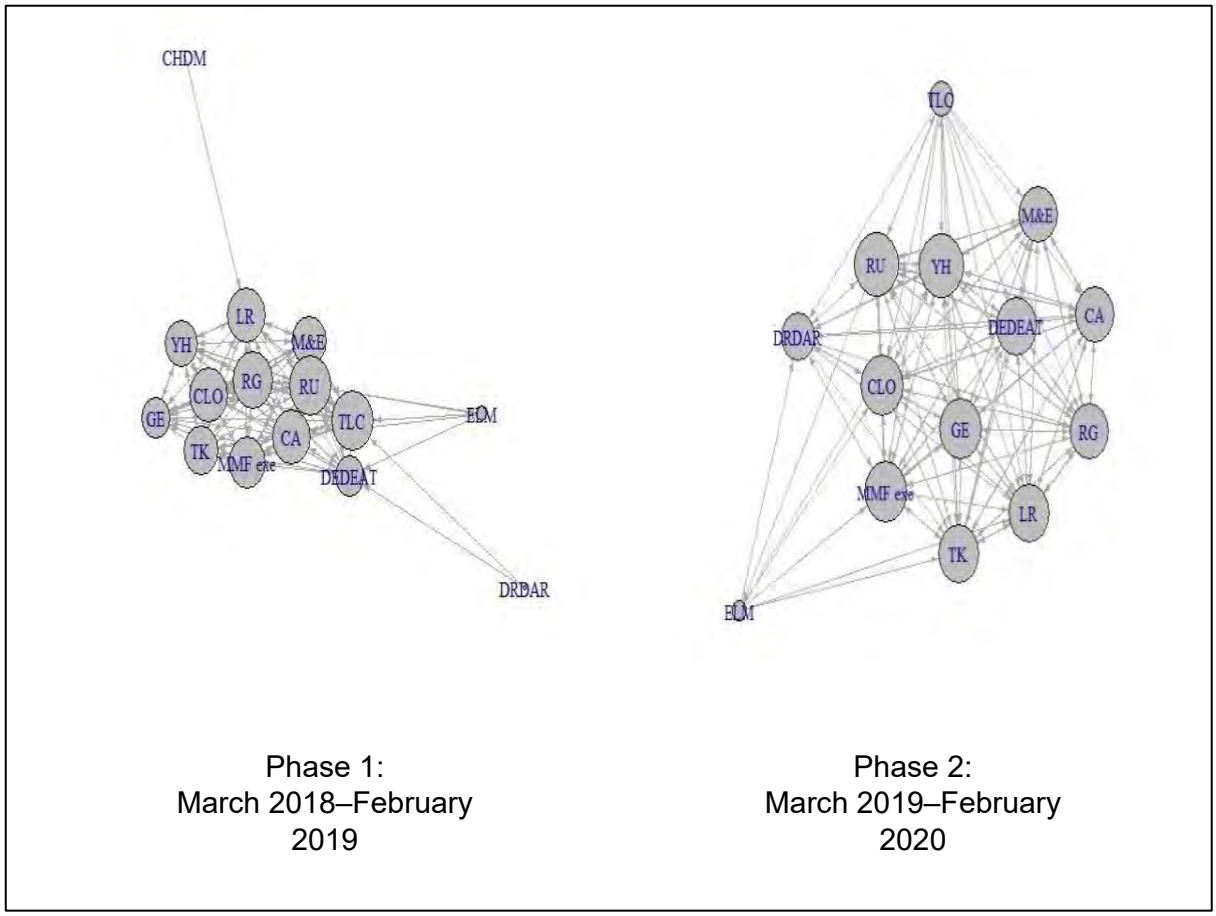


Figure 4.9 Overview of the Inter-organisational trust network. Arrows represent directed, weighted ties, and circle size represents degree centrality. Rhodes University (RU), Department of Economic Development, Environmental Affairs, and Tourism (DEDEAT), Department of Rural Development and Agrarian Reform (DRDAR), Chris Hani District Municipality (CHDM), Emalahleni Local Municipality (ELM), Traditional Leaders Council (TLC), Masibambisane multi-actor forum executive (MMF exe), GEF5 Community liaison officers (CLO), Conservation Agriculture Hub (CA), Land Rehabilitation Hub (LR), Rangeland Management Hub (RG), Training and Knowledge Hub (TK), M&E Hub (M&E), Gender Equity Hub (GE), and Youth Hub (YH).

However, the MMF responded by highlighting that:

"when making decisions, we include the two headmen and their seven sub-headmen. However, when a headman misses an important meeting, it is the responsibility of the sub-headmen to inform their headman."

Further probing revealed that some of the tensions emanated from unclear communication channels among the multiple semi-autonomous institutions at the local level. Other network members highlighted that the diminishing legitimacy of traditional leaders, due to multiple independent institutions, created tensions within the transformative space (coded eight times). Further analysis revealed that there were more strong ties among different hubs and the MMF executive than with the Traditional Leaders Council.

4.5.5 Reflection Phase

Three months after analysing the social network data, transformative space members held a workshop to identify key barriers and strategies that enable effective collaboration and coordination. Network members identified four key barriers and practical suggestions to enable effective collaboration (Table 4.2).

Workshop participants suggested that constant M&E of governance process is a necessary way of identifying key barriers. First, workshop participants mentioned time constraints (coded 67 times) as one of the key barriers that affected effective collaboration. To solve this challenge, workshop participants highlighted the need for finding mutual workshop dates that enable inclusive participation of all actors across scales. Furthermore, government officials highlighted the need for sharing institutional work calendars as a way of enabling effective workshop planning and reducing high turnover rates. Second, workshop participants identified weak communication channels (coded 57 times) between local hubs and the Traditional Leaders Council as one of the key barriers to effective collaboration at the local level, with one hub leader highlighting:

"I think failure to communicate effectively among ourselves has strained our relations and has resulted in us forming unnecessary cliques which are unhealthy."

Table 4.2 Identified strategies to overcome barriers to effective collaboration and coordination in transformative spaces

Identified Barrier	***Strategy***
Time constraints	• Finding alternative dates that suit all actors. • Dissemination and sharing of institutional calendars to enable effective planning. • Deepen and accelerate the development of local municipality technical capacity.
Weak communication channels	• Extend and deepen collaboration, coordination, and communication across scales. • Facilitate vertical and horizontal communication. • Local leaders to oversee project performance and relationships.
Functional incompatibility of democratic and traditional structures at the local level	• Leadership training and capacity development of traditional leaders and hub leaders, e.g. conflict resolution training. • Strengthen and support MMF leadership to develop and implement relevant forum policies and a code of ethics.
Leakages of human capital	• Enhance women participation by including female-headed families and single women engaged in livestock farming. • Provide transport for network members. • Provide short-term employment for youths as data enumerators. • Support s*mall business development* for the local people, especially the youth and women.

Furthermore, network members emphasised that vertical and horizontal communication and accountability are necessary for effective coordination at the local scale, with one hub member suggesting that:

"In order to achieve our goals, we need effective communication and transparency. I have realised that if we work in silos, we will not achieve most of the goals we set in 2018."

Additionally, network members suggested that information deficits could be addressed by extending and deepening collaboration, coordination, and communication. To achieve cross-scale coordination, the project team, Traditional Leaders Council, and SLM hub leaders were to be included in the Emalahleni Intergovernmental Relations Forum (IGR). Third, network members identified functional incompatibility of local hubs and traditional structures (coded 32 times) as one key barrier to effective collaboration. Leadership training and capacity development of traditional leaders and hub leaders were suggested as key strategies to enhance functional compatibility. Most importantly, network members identified that there is a need to strengthen and support MMF leadership to develop and implement relevant forum policies, bylaws, and a code of ethics. Other strategies included enhancement of relationships, changing of mindsets, and renewal of commitments between actors within and across scales. Lastly, network members identified leakage of human capital (coded 27 times) as a barrier to effective collaboration. Other identified strategies included providing transport for network members, creating short-term employment opportunities, and supporting small business development for the local people, especially the youth. One youth member highlighted:

"In order for real transformation to happen in Machubeni, the government and research institutes should create job opportunities that appeal to the youths. I took the youth garden job because I am desperate to make a living otherwise if I were to get a better job opportunity in Johannesburg, I would definitely quit the youth garden job. Moreover, after 2022, there will not be project funding; there is no need to stay permanently in Machubeni."

4.6 Discussion

This research intends to achieve a greater understanding of how evolving multi-actor and multi-level ties influence the level of information-sharing, inter-organisational trust, and views of shared goals in emerging transformative spaces over time. Our work has underscored the potential benefits and challenges of establishing a transformative space that includes multiple actors across and within scales, i.e. natural resource users, traditional leaders, key government departments, and researchers. Without overstating the claims of our results, the data support the two hypotheses: firstly, transformative spaces enable broader levels of participation among actors between and within scales; and secondly, strong social-relational linkages (i.e. network ties) increase over time across and within scales. Overall, our findings depict that bringing together a diverse network enabled open dialogue and reflexive learning among key actors within and across scales in Machubeni, mirroring what has been written about transformative spaces (Pereira et al. 2018, 2019). Below we discuss our findings from the perspective of transformative spaces, social networks, social capital, and polycentric governance literature.

Results presented in this study show that the proportion of strong ties across three governance networks (common goals, inter-organisational trust, and information-sharing) increased over time. This increase may suggest that broader levels of participation and interaction of different actors across scales may be necessary for enhancing collaboration and coordination in transformative spaces. For example, multi-actor ties among government institutes, local hubs, and the research team contributed to the increase in knowledge-sharing and coordination. That multi-level ties connected actors vertically (across multiple levels) demonstrates that polycentrism might be essential in enhancing cross-scale learning and knowledge-sharing in transformative spaces. Furthermore, evidence from interviews suggests that inter-organisational trust played an essential role in enhancing knowledge-sharing and coordination in transformative spaces. This finding supports points elucidated by Newell and Swan (2000), who suggested that inter-organisational trust is central to the effective operation of governance networks. Therefore, we argue that increased social capital can enhance collaboration and coordination in multi-actor and multi-level networks.

Another important finding that emerged from our study is that it takes time to develop and nurture multi-level trust. Network members highlighted that high turnover of government and municipality officers affected inter-organisational trust and knowledge-sharing networks. For example, whenever a new government or municipality official joined the transformative space, it meant that new trust-building, learning, and engagement processes must take place, thereby making it challenging to develop and nurture trust (Cundill and Fabricius 2008). Cundill and Fabricius (2008) highlighted that mistrust from government or municipality will remain there until they can solve their operational challenges. It is therefore critical for government or municipality officials to take charge in building trust with local communities. This requires building social capital and resilience and strengthening human capacities of rural communities. Therefore, we urge researchers and government agencies involved in transformative spaces to continuously monitor and track network perceptions that influence trust throughout the stages of network development.

Results from the SNA analysis indicate that Rhodes University plays a vital role as a transformative space-maker within the transformative space. Compared to other organisations within the transformative space, Rhodes University recorded significantly high metric scores in both phases, demonstrating its importance as a convenor, facilitator, and knowledge provider. On the other hand, significantly high metric scores (e.g. in Phase 1) might mean that the transformative space is highly centralised around Rhodes University. Given that university-supported transformative spaces have limited funding and strict time frames, we suggest that it is necessary to foster and strengthen capacities of other semi-autonomous organisations within the network, especially the local hubs. Building network redundancy of other semi-autonomous organisations within transformative spaces might help reduce exposure to institutional failure (Ostrom 1999, 2012, Gelcich 2014). For instance, capacity building of local hubs may help build network resilience and, in turn, improve multi-level connectivity.

Our study has highlighted the importance of analysing the administrative powers of key actors. We propose that it is “more than just engaging with any government official”; there is a need to balance engagement between junior-, middle-, and senior-ranking officials when establishing a transformative space. Our case analysis has demonstrated that the

absence of senior-ranking officials in transformative spaces hinders decision-making and transformative institutional change. Both junior- and middle-ranking officials do not have administrative powers to implement crucial decisions that may enable effective collaboration and coordination. Given the complex nature of the administrative setup of government organisation, we acknowledge that there is no 'silver bullet' in addressing these power imbalances, but transformative learning is a critical prerequisite for finding solutions to address structural dimensions (Boström et al. 2018). Furthermore, we propose that the community services department at the local municipality is best suited to effect transformations in Machubeni, given that its role is to contribute towards a safe and secure environment. However, this requires skills capacity development and training in systems thinking. Improving the institutional capacity of local municipalities might necessitate effective coordination of multiple municipality departments and knowledge-sharing (Meyer and Cloete 2006, Maserumule 2008).

Governance literature highlights the importance of scale-crossing brokers' collaboration in networks (Ernstson et al. 2010). In South Africa, local government is identified as a critical administrative level at which to effect transformations (Republic of South Africa. 1998b), considering that it is the first point of contact between local communities and government (Thornhill 2008). Furthermore, local municipalities are identified as the most appropriate policy implementers at the local level (Koma 2010). However, we pinpointed a weakness in their connectivity within the transformative space. The relatively weak ties between the local municipality and the rest of the network implied their low capacity to influence knowledge exchange in transformative spaces. Given the low capacity to influence knowledge exchange and collaboration, the local municipality might not be able to effect transformations and knowledge-sharing within Machubeni (Republic of South Africa. 1998b). Failure to effect transformations might exacerbate the rate of land degradation, thereby eroding people's livelihoods and pushing them further into poverty. Failure to effect transformations might depress innovation and productivity in the area, which is highly dependent on social grants. We recommend that transformative and robust leadership is needed to steer implementation in the right direction at the local municipality level.

Prell et al. (2009) suggested that actors sharing weak ties may find it challenging to engage in open dialogue. Our results depict that the weak ties between the traditional leaders and MMF executive at the local level might hinder or fracture transformations and collaboration at the local level. Interview data revealed that the tensions at the local level might have been caused by jealousy and ineffective communication channels. However, a more in-depth analysis revealed that the creation of multiple semi-autonomous hubs at the local level created tensions, because it diluted the influence of the traditional leaders in the area. We attributed this to the power of hubs to make individual decisions without consulting the traditional leaders. The question as to whether the current governance arrangements foster long-term cooperation or whether they are prone to disintegrate further remains to be seen. Some authors argue that it is difficult to merge democratic and traditional structures in South Africa because of possible dictatorial tendencies of traditional leaders (Meer and Campbell 2004, Ntsebeza 2004). However, we argue that the traditional leadership is compatible with modern democracy and has the potential to improve governance and collaboration, and also effect transformations in rural South Africa for two reasons. Firstly, from a SLM perspective, the Communal Land Tenure Policy (CLTP) mandates the traditional leaders to distribute land in their areas (DRDLR 2014). As such, it is their role as traditional leaders to ensure that community needs and interests are factored into local and district planning. Secondly, the Municipal Structures Act allows traditional leaders to attend and participate in council meetings as ex-officio members, thereby enhancing co-operative governance across scales.

Despite the importance of traditional leadership in a modern democracy, we identified three institutional gaps that may hinder transformations in rural South Africa. Firstly, we identified as a major barrier, traditional leaders' inadequate skills and knowledge to pursue their mandate effectively. For example, our study highlighted that traditional leadership was ineffective in managing partnerships for the benefit of the whole community. Secondly, our results showed that traditional leadership structures (e.g. headman and sub-headman) were ineffective in consulting and engaging with communities. Thirdly, our analysis revealed that women were not represented in traditional structures in Machubeni, which is far below the 33.3% national policy requirement (Republic of South Africa. 2003). Therefore, it is necessary to strengthen and capacitate traditional leaders as a way of enhancing

transformative governance to promote sustainability in rural South Africa. Lack of female representation might lead to the exclusion of women from participating in transformative spaces, making it an "all men affair." Women constitute 70% of the Machubeni population and their main source of livelihood is farming and livestock (Stats SA. 2011). For transformation to occur, we propose that transformative spaces need to be inclusive of all key actors, including women.

Furthermore, our paper demonstrates the importance of longitudinal data and M&E for elucidating transformations in transformative spaces. With growing interest in transformations to sustainability (Pereira et al. 2015, 2018, 2019), there is a need for adequate M&E. Lessons learned from this study include the importance of monitoring network dynamics and system perceptions as a way of tracking the actual performance of transformative spaces. Without an understanding of network dynamics and system perceptions, we believe it will be difficult to envisage network pathways that influence institutional change in transformative spaces. We reason that project teams or research institutions involved in land degradation initiatives should consider strengthening M&E. This might be crucial in achieving developmental impacts and detecting institutional change that is attributed to transformative change (Pereira et al. 2019). M&E might help in informing transformations and identifying barriers to transformations. We also recommend that M&E can be used as an effective tool for learning. We argue for future researchers to employ Exponential Random Graph Models (ERGM) to test for more specific propositions, such as analysing the conditions of institutional fit within transformative spaces (Hermans et al. 2017).

4.7 Conclusions

Our results support the two hypotheses: firstly, that transformative spaces enable broader levels of participation among actors between and within scales and secondly, that strong social-relational linkages (i.e. network ties) increased over time across and within scales. With regard to the first hypothesis, this paper has highlighted the implications of polycentrism in enabling broader levels of participation, cross-scale collaboration, and learning in transformative spaces. Despite the findings highlighting the potential role of transformative spaces in ensuring broader levels of participation, ineffective communication

channels at the local level caused tensions among the semi-autonomous hubs. This suggests that polycentric governance networks might present specific challenges. We identified leadership training (e.g. conflict resolution training) and capacity development of traditional leaders and hub leaders as necessities in enhancing effective collaboration and coordination.

The findings from this study illustrate the importance of employing a social-relational perspective in analysing changing social connections and relationships in transformative spaces. We observed that actors with strong ties of trust also possessed similar strong ties of information-sharing within the network. In particular, inter-organisational trust played an essential role in enhancing knowledge sharing and coordination. We found that learning is a critical prerequisite for finding solutions to address structural dimensions within a transformative space over time. Network members identified strategies to strengthen collaboration and coordination in transformative spaces through learning. While the transformative space in Machubeni has succeeded in enhancing collaboration and knowledge-sharing between groups that did not previously engage in dialogue, further long-term engagement with government agencies might be necessary for promoting institutional transformations and policy outcomes, and building network resilience in complex polycentric governance systems.

4.8 References

Alexander, S. M., D. Armitage, P. J. Carrington, and Ö. Bodin. 2017. Examining horizontal and vertical social ties to achieve social-ecological fit in an emerging marine reserve network. *Aquatic Conservation: Marine and Freshwater Ecosystems* 27(6):1209–1223.

Alexander, S. M., D. Armitage, and A. Charles. 2015. Social networks and transitions to co-management in Jamaican marine reserves and small-scale fisheries. *Global Environmental Change* 35:213–225.

ATS/Ikwezi. 2004. Machubeni land use plan assessment report. *Rhodes University* (1):1–56.

Bazeley, P. 2012. Integrative Analysis Strategies for Mixed Data Sources. *American Behavioral Scientist* 56(6):814–828.

Bisaro, A., M. Kirk, P. Zdruli, and W. Zimmermann. 2014. Global Drivers Setting Desertification Research Priorities: Insights from a Stakeholder Consultation Forum. *Land Degradation & Development* 25(1):5–16.

Bixler, R. P. 2014. From Community Forest Management to Polycentric Governance: Assessing Evidence from the Bottom Up. *Society & Natural Resources* 27(2):155–169.

Bodin, Ö. 2017. Collaborative environmental governance: Achieving collective action in social-ecological systems. *Science* 357(6352).

Bodin, Ö., and B. I. Crona. 2008. Management of Natural Resources at the Community Level: Exploring the Role of Social Capital and Leadership in a Rural Fishing Community. *World Development* 36(12):2763–2779.

Bodin, Ö., and C. Prell. 2011. *Social Networks and Natural Resource Management: Uncovering the Social Fabric of Environmental Governance*. Cambridge University Press.

Borg, R., A. Toikka, and E. Primmer. 2015. Social capital and governance: a social network analysis of forest biodiversity collaboration in Central Finland. *Forest Policy and Economics* 50:90–97.

Boström, M., E. Andersson, M. Berg, K. Gustafsson, E. Gustavsson, E. Hysing, R. Lidskog, E. Löfmarck, M. Ojala, J. Olsson, B. E. Singleton, S. Svenberg, Y. Uggla, and J. Öhman. 2018. Conditions for Transformative Learning for Sustainable Development: A Theoretical Review and Approach. *Sustainability* 10(12):4479.

Carolan, B. V. 2013. *Social Network Analysis and Education: Theory, Methods & Applications*. SAGE Publications.

Cash, D. W., W. N. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young. 2006. Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World. *Ecology and Society* 11(2).

Chambers, R. 2012. *Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities*. Routledge.

Coleman, J. S. 1988. Social Capital in the Creation of Human Capital. *American Journal of Sociology*94:S95–S120.

Cundill, G. 2008. Learning, governance and livelihoods: Toward adaptive co-management under resource poor conditions in South Africa. PhD Thesis, Rhodes University.

Cundill, G., and C. Fabricius. 2008. *Adaptive co-management under resource-poor conditions: Lessons from South Africa. In Exploring Sustainability Science: A Southern African Perspective*. Burns, S., Weaver, A., Eds. Sun Press: Stellenbosch, South Africa.

Cundill, G., and C. Fabricius. 2010. Monitoring the Governance Dimension of Natural Resource Co-management. *Ecology and Society* 15(1).

Dekker, P., and E. M. Uslaner. 2001. *Social Capital and Participation in Everyday Life, edited by Eric M. Uslaner*. London: Routledge.

Díaz, S., S. Demissew, J. Carabias, C. Joly, M. Lonsdale, N. Ash, A. Larigauderie, J. R. Adhikari, S. Arico, A. Báldi, A. Bartuska, I. A. Baste, A. Bilgin, E. Brondizio, K. M. Chan, V. E. Figueroa, A. Duraiappah, M. Fischer, R. Hill, T. Koetz, P. Leadley, P. Lyver, G. M. Mace, B. Martin-Lopez, M. Okumura, D. Pacheco, U. Pascual, E. S. Pérez, B. Reyers, E. Roth, O. Saito, R. J. Scholes, N. Sharma, H. Tallis, R. Thaman, R. Watson, T. Yahara, Z. A. Hamid, C. Akosim, Y. Al-Hafedh, R. Allahverdiyev, E. Amankwah, S. T. Asah, Z. Asfaw, G. Bartus, L. A. Brooks, J. Caillaux, G. Dalle, D. Darnaedi, A. Driver, G. Erpul, P. Escobar-Eyzaguirre, P. Failler, A. M. M. Fouda, B. Fu, H. Gundimeda, S. Hashimoto, F. Homer,

S. Lavorel, G. Lichtenstein, W. A. Mala, W. Mandivenyi, P. Matczak, C. Mbizvo, M. Mehrdadi, J. P. Metzger, J. B. Mikissa, H. Moller, H. A. Mooney, P. Mumby, H. Nagendra, C. Nesshover, A. A. Oteng-Yeboah, G. Pataki, M. Roué, J. Rubis, M. Schultz, P. Smith, R. Sumaila, K. Takeuchi, S. Thomas, M. Verma, Y. Yeo-Chang, and D. Zlatanova. 2015. The IPBES Conceptual Framework — connecting nature and people. *Current Opinion in Environmental Sustainability* 14:1–16.

DRDLR. 2014. Communal Land Tenure Policy. Pretoria: South Africa. Government Printer.

Drimie, S., R. Hamann, A. Manderson, and N. Mlondobozi. 2018. Creating transformative spaces for dialogue and action: reflecting on the experience of the Southern Africa Food Lab. *Ecology and Society* 23(3).

Dyer, M. 2018. Transforming communicative spaces: the rhythm of gender in meetings in rural Solomon Islands. *Ecology and Society* 23(1).

Emalahleni Municipal Assessment. 2018. Municipal Demarcation: Machubeni Communal Lands. *ELM* 1(4):1–80.

Ernstson, H., S. Barthel, E. Andersson, and S. T. Borgström. 2010. Scale-Crossing Brokers and Network Governance of Urban Ecosystem Services: The Case of Stockholm. *Ecology and Society* 15(4).

Falayi, M., S. E. Shackleton, G. C. Kemp, and C. M. Shackleton. 2019. Changes in household use and sale of locally collected environmental resources over a 15-year period in a rural village, South Africa. *Forests, Trees and Livelihoods* 28(2):90–107.

Faysse, N. 2006. Troubles on the way: An analysis of the challenges faced by multi-stakeholder platforms. *Natural Resources Forum* 30(3):219–229.

Folke, C., T. Hahn, P. Olsson, and J. Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30(1):441–473.

Frantzeskaki, N., J. Wittmayer, and D. Loorbach. 2014. The role of partnerships in 'realising' urban sustainability in Rotterdam's City Ports Area, The Netherlands. *Journal of Cleaner Production* 65:406–417.

Galaz, V., P. Olsson, T. Hahn, C. Folke, and U. Svedin. 2008. The Problem of Fit among Biophysical Systems, Environmental and Resource Regimes, and Broader Governance Systems: Insights and Emerging Challenges. Pages 147–186 *in* O. R. Young, L. A. King, and H. Schroeder, editors. *Institutions and Environmental Change*. The MIT Press.

Gambeta, D. 1988. 'Mafia: The price of distrust', in Diego Gambetta (ed), Trust: Making and Breaking Cooperative Relations, London: Basil Blackwell.

Gelcich, S. 2014. Towards polycentric governance of small-scale fisheries: insights from the new 'Management Plans' policy in Chile. *Aquatic Conservation: Marine and Freshwater Ecosystems* 24(5):575–581.

Hassan, R. (ed), R. (ed) Scholes, and N. (ed) Ash. 2005. Ecosystems and human well-being: current state and trends.

Hermans, F., M. Sartas, B. van Schagen, P. van Asten, and M. Schut. 2017. Social network analysis of multi-stakeholder platforms in agricultural research for development: Opportunities and constraints for innovation and scaling. *PLOS ONE* 12(2):e0169634.

Hoffman, M. T., and S. Todd. 2000. A national review of land degradation in South Africa: the influence of biophysical and socio-economic factors. *Journal of Southern African Studies* 26(4):743–758.

Howitt, R. 2007. Scale. Pages 132–157 *A Companion to Political Geography*. John Wiley & Sons, Ltd.

Koma, S. B. 2010. The state of local government in South Africa: issues, trends and options. *Journal of Public Administration* 45(Special issue 1):111–120.

Kusters, K., L. Buck, M. de Graaf, P. Minang, C. van Oosten, and R. Zagt. 2018. Participatory Planning, Monitoring and Evaluation of Multi-Stakeholder Platforms in Integrated Landscape Initiatives. *Environmental Management* 62(1):170–181.

Lam, A. 2005. *Organizational learning. In J. Fagerberg, D. C. Mowery, and R. R. Nelson, editors. The Oxford handbook of innovation. Oxford:* Oxford University Press.

Lee, T. 2019. Network comparison of socialization, learning and collaboration in the C40 cities climate group. *Journal of Environmental Policy & Planning* 21(1):104–115.

Leventon, J., L. Fleskens, H. Claringbould, G. Schwilch, and R. Hessel. 2016. An applied methodology for stakeholder identification in transdisciplinary research. *Sustainability Science* 11(5):763–775.

Low, B., E. Ostrom, C. Simon, and J. Wilson. 2003. *Redundancy and Diversity: Do They Influence Optimal Management?* In *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change, ed. FikretBerkes, Johan Colding, and Carl Folke. Cambridge, UK: Cambridge University Press, 83–111*. Cambridge University Press.

Mansourian, S. 2018. In the eye of the beholder: Reconciling interpretations of forest landscape restoration. *Land Degradation & Development* 29(9):2888–2898.

Marshall, F., J. Dolley, and R. Priya. 2018. Transdisciplinary research as transformative space making for sustainability: enhancing propoor transformative agency in periurban contexts contexts. *Ecology and Society* 23:8.

Maserumule, M. H. 2008. Framework for strengthening the capacity of municipalities in South Africa: A developmental local government perspective. *Journal of Public Administration* 43(Special issue 2):436–451.

Mbow, C. 2020. Use It Sustainably or Lose It! The Land Stakes in SDGs for Sub-Saharan Africa. *Land* 9(3):63.

McGinnis, M. D., and E. Ostrom. 2012. Reflections on Vincent Ostrom, Public Administration, and Polycentricity. *Public Administration Review* 72(1):15–25.

Meer, T., and G. Campbell. 2004. Traditional Leadership in Democratic South Africa, Durban: Democracy Development Programme. DDP.

Merino-Pérez, L. 2004. *Conservation or Deterioration: The impact of public policies on community institutions and on the use practices of forest resources*. Instituto Nacional de Ecología.

Meyer, I. H., and F. Cloete. 2006. Policy dynamics: change, failure and success. *Improving Public Policy: from theory to practise. Pretoria: Van Schaik Publishers*.

Milder, J. C., L. E. Buck, F. DeClerck, and S. J. Scherr. 2012. Landscape Approaches to Achieving Food Production, Natural Resource Conservation, and the Millennium Development Goals. *Integrating Ecology and Poverty Reduction*:77–108.

Millennium Assessment. 2005. Ecosystem and human well-being: biodiversity synthesis. *World Resources Institute, Washington, DC*.

Moore, M.-L., P. Olsson, W. Nilsson, L. Rose, and F. Westley. 2018. Navigating emergence and system reflexivity as key transformative capacities: experiences from a Global Fellowship program. *Ecology and Society* 23(2).

Morrison, T. H., W. N. Adger, K. Brown, M. C. Lemos, D. Huitema, J. Phelps, L. Evans, P. Cohen, A. M. Song, R. Turner, T. Quinn, and T. P. Hughes. 2019. The black box of power in polycentric environmental governance. *Global Environmental Change* 57:101934.

Mucina, L., and M. C. Rutherford. 2006. *The vegetation of South Africa, Lesotho and Swaziland.* South African National Biodiversity Institute.

Newell, S., and J. Swan. 2000. Trust and inter-organizational networking. *Human Relations* 53(10):1287–1328.

Ntsebeza, L. 2004. Rural Governance and Citizenship in post-1994 South Africa: Democracy Compromised? University of Cape Town, South Africa.

Olsson, P., M.-L. Moore, F. R. Westley, and D. D. P. McCarthy. 2017. The concept of the Anthropocene as a game-changer: a new context for social innovation and transformations to sustainability. *Ecology and Society* 22(2).

Ostrom, E. 1999. Coping with tragedies of the commons. *Annual Review of Political Science* 2(1):493–535.

Ostrom, E. 2009a. A general framework for analyzing sustainability of social-ecological systems. *Science* 325(5939):419–422.

Ostrom, E. 2009b. *Understanding Institutional Diversity*. Princeton University Press.

Ostrom, E. 2010. Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *American Economic Review* 100(3):641–672.

Ostrom, E. 2012. Why Do We Need to Protect Institutional Diversity? *European Political Science* 11(1):128–147.

Ostrom, E., and T. K. Ahn. 2009. *The meaning of social capital and its link to collective action in Handbook of Social Capital: The Troika of Sociology, Political Science and Economics*. Edward Elgar Publishing.

Pahl-Wostl, C., and M. Hare. 2004. Processes of social learning in integrated resources management. *Journal of Community & Applied Social Psychology* 14(3):193–206.

Patterson, J., K. Schulz, J. Vervoort, S. van der Hel, O. Widerberg, C. Adler, M. Hurlbert, K. Anderton, M. Sethi, and A. Barau. 2017. Exploring the governance and politics of transformations towards sustainability. *Environmental Innovation and Societal Transitions* 24:1–16.

Pereira, L., N. Frantzeskaki, A. Hebinck, L. Charli-Joseph, S. Drimie, M. Dyer, H. Eakin, D. Galafassi, T. Karpouzoglou, F. Marshall, M.-L. Moore, P. Olsson, J. M. Siqueiros-García, P. van Zwanenberg, and J. M. Vervoort. 2019. Transformative spaces in the making: key lessons from nine cases in the Global South. *Sustainability Science*.

Pereira, L., T. Karpouzoglou, S. Doshi, and N. Frantzeskaki. 2015. Organising a Safe Space for Navigating Social-Ecological Transformations to Sustainability. *International Journal of Environmental Research and Public Health* 12(6):6027–6044.

Pereira, L., T. Karpouzoglou, N. Frantzeskaki, and P. Olsson. 2018. Designing transformative spaces for sustainability in social-ecological systems. *Ecology and Society* 23(4).

Pinkse, J., and A. Kolk. 2012. Addressing the Climate Change—Sustainable Development Nexus: The Role of Multistakeholder Partnerships - Jonatan Pinkse, Ans Kolk, 2012. *Bus Soc* 51:176-210.

Prell, C., K. Hubacek, and M. Reed. 2009. Stakeholder Analysis and Social Network Analysis in Natural Resource Management. *Society & Natural Resources* 22(6):501–518.

Putnam, R. D. 2000. Bowling Alone: America's Declining Social Capital. Pages 223–234 *in* L. Crothers and C. Lockhart, editors. *Culture and Politics: A Reader*. Palgrave Macmillan US, New York.

Reed, M. S., A. J. Dougill, and M. J. Taylor. 2007. Integrating local and scientific knowledge for adaptation to land degradation: Kalahari rangeland management options. *Land Degradation & Development* 18(3):249–268.

Reed, M. S., L. C. Stringer, A. J. Dougill, J. S. Perkins, J. R. Atlhopheng, K. Mulale, and N. Favretto. 2015. Reorienting land degradation towards sustainable land management: Linking sustainable livelihoods with ecosystem services in rangeland systems. *Journal of environmental management* 151:472–485.

Republic of South Africa. 1998a. Local Government: Municipal Demarcation Act, Act No. 27 of 1998. Cape Town: South Africa.

Republic of South Africa. 1998b. The White Paper on local government: Ministry for Provincial Affairs and Constitutional Development. Pretoria: South Africa.

Republic of South Africa. 2003. Traditional leadership and governance framework act, No 41 of 2003. Cape Town: South Africa.

Sardeshpande, M., and C. Shackleton. 2020. Urban foraging: Land management policy, perspectives, and potential. *PLOS ONE* 15(4):e0230693.

Scholes, R., L. Montanarella, A. Brainich, N. Barger, B. ten Brink, M. Cantele, B. Erasmus, J. Fisher, T. Gardner, and T. G. Holland. 2018. Summary for Policymakers of the Thematic Assessment Report on Land Degradation and Restoration of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. *IPBES Secretariat: Bonn, Germany*:1–31.

Schoon, M., and M. Cox. 2018. Collaboration, Adaptation, and Scaling: Perspectives on Environmental Governance for Sustainability. *Sustainability* 10(3):679.

Schoon, M. L., M. D. Robards, C. L. Meek, and V. Galaz. 2015. Principle 7 – Promote polycentric governance systems. *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems*:226–250.

Schoon, M., A. York, A. Sullivan, and J. Baggio. 2017. The emergence of an environmental governance network: the case of the Arizona borderlands. *Regional Environmental Change* 17(3):677–689.

Schwilch, G., F. Bachmann, and H. Liniger. 2009. Appraising and selecting conservation measures to mitigate desertification and land degradation based on stakeholder participation and global best practices. *Land Degradation & Development* 20(3):308–326.

Scoones, I., A. Stirling, D. Abrol, J. Atela, L. Charli-Joseph, H. Eakin, A. Ely, P. Olsson, L. Pereira, R. Priya, P. van Zwanenberg, and L. Yang. 2020. Transformations to sustainability: combining structural, systemic and enabling approaches. *Current Opinion in Environmental Sustainability*.

Scott, J., and P. J. Carrington. 2011. *The SAGE handbook of social network analysis*. SAGE publications.

Shackleton, C. M., and J. Gambiza. 2008. Social and ecological trade-offs in combating land degradation: the case of invasion by a woody shrub (Euryops floribundus) at Macubeni, South Africa. *Land degradation & development* 19(4):454–464.

Shackleton, S., and M. Luckert. 2015. Changing Livelihoods and Landscapes in the Rural Eastern Cape, South Africa: Past Influences and Future Trajectories. *Land* 4(4):1060–1089.

Stats SA. 2011. Statistics by place, Emalahleni Local Municipality. Pretoria.

Steffen, W., P. J. Crutzen, and J. R. McNeill. 2007. The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature. *AMBIO: A Journal of the Human Environment* 36(8):614–621.

Steffen, W., J. Rockström, K. Richardson, T. M. Lenton, C. Folke, D. Liverman, C. P. Summerhayes, A. D. Barnosky, S. E. Cornell, M. Crucifix, J. F. Donges, I. Fetzer, S. J. Lade, M. Scheffer, R. Winkelmann, and H. J. Schellnhuber. 2018. Trajectories of the Earth System in the Anthropocene. *Proceedings of the National Academy of Sciences* 115(33):8252–8259.

Stringer, L. C., A. J. Dougill, E. Fraser, K. Hubacek, C. Prell, and M. S. Reed. 2006. Unpacking "Participation" in the Adaptive Management of Social–ecological Systems: A Critical Review. *Ecology and Society* 11(2).

Stringer, L. C., M. S. Reed, A. J. Dougill, M. K. Seely, and M. Rokitzki. 2007. Implementing the UNCCD: Participatory challenges. *Natural Resources Forum* 31(3):198–211.

Thornhill, C. 2008. The transformed local government system: some lessons. *Journal of Public Administration* 43(Special issue 2):492–511.

Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. 2004. Resilience, Adaptability and Transformability in Social–ecological Systems. *Ecology and Society* 9(2).

Warner, J. 2005. Multi-stakeholder platforms: integrating society in water resource management? *Ambient Soc* 8:4-28.

Westley, F., O. Tjornbo, L. Schultz, P. Olsson, C. Folke, B. Crona, and Ö. Bodin. 2013. A Theory of Transformative Agency in Linked Social-Ecological Systems. *Ecology and Society* 18(3).

Young, O. R. 2008. The Architecture of Global Environmental Governance: Bringing Science to Bear on Policy. *Global Environmental Politics* 8(1):14–32.

Zoumides, C., A. Bruggeman, E. Giannakis, C. Camera, H. Djuma, M. Eliades, and K. Charalambous. 2017. Community-Based Rehabilitation of Mountain Terraces in Cyprus. *Land Degradation & Development* 28(1):95–105.

van Zwanenberg, P., A. Cremaschi, M. Obaya, A. Marin, and V. Lowenstein. 2018. Seeking unconventional alliances and bridging innovations in spaces for transformative change: the seed sector and agricultural sustainability in Argentina. *Ecology and Society* 23(3).

Chapter 5: The Importance of Agency in Fractured Governance Contexts: A Southern African Perspective

This chapter is under review as**:** Falayi M, Gambiza J, Schoon M, Cundill G, Palmer A, Sisitka L, Cumming GS, Cumming DHM, Palmer CG. The Importance of Agency in Fractured Governance Contexts: A Southern African Perspective. In third round review with *Ecology and Society*.

Abstract

Environmental governance defines the relationships between institutions (rules and norms), structures (formal and informal networks), and processes (policy and decision-making) that affect and respond to ecosystem condition. One of the central goals of social-ecological science has been to understand how the interactive roles of different elements of environmental governance influence the long-term success or failure of social-ecological systems. An important but relatively little-studied element of environmental governance concerns agency: both the capacity of people and organisations to make choices and decisions about their lives, and their and others' recognition of this capacity. Southern Africa offers a fascinating region in which to study agency because it has seen the emergence of democratically elected governments after decades of top-down colonial rule that negatively affected local agency. We explored the relevance of agency for the effectiveness of environmental governance by applying Archer's morphogenetic framework and Bennett and Satterfield's practical framework to describe and analyse two co-management case studies. Despite the careful institutional design and implementation in each case, governance appears to have been considerably weakened by political and other schisms between key actors and their mandates, opening fractures in the governance frameworks. These fractures in turn, reduced support for the development of individual and collective agency. Our analysis suggests that in attempts to shift governance structures towards greater effectiveness (improved functionality), functional improvement alone is inadequate; agency must be directly addressed.

Keywords: agency; effectiveness; environmental governance; environmental management; fractured governance; southern Africa

5.1 Introduction

One of the key challenges in analysing complex systems is understanding the relationships between structure and function. In social systems, the structure is mostly determined by institutions, including the rules and norms governing people's actions and the making of these rules, the location of power, and power relations. Function (e.g. collective decision-making and responses to external events) emerges from the collective actions of organisations and individuals (Cumming et al. 2020). In environmental governance, there is a general assumption that actors are expected to behave in ways that are consistent with their individual or organisational roles and with existing institutions and relationships (Graham et al. 2003, Lockwood 2010). The guiding assumption of many analyses in environmental governance is that if the 'correct' structures (composition, spatial pattern and connectedness) are in place, organisations and individuals will perform their functions (e.g. the governance and management of natural resources) effectively (Lockwood et al. 2010, Bennett and Satterfield 2018). In this paper, we use two case studies from southern Africa (South Africa and Zimbabwe) to explore some of the reasons why apparent adequacy in governance structures (specifically, institutions and social networks, at multiple hierarchical levels) does not necessarily equate to effectiveness in function.

We use environmental governance to refer to ordering relationships between individuals and groups of individuals through institutions that relate directly to natural resource use (Ostrom 1994). In its most basic form, governance includes the interactions among structures, rulemaking and power-sharing (Dietz et al. 2003). These interactions are influenced by informal and formal institutions, including norms and values that underpin rules and traditions (e.g. Osei-Tutu et al. 2015). The growing realisation of challenges associated with governing complex social-ecological systems has prompted the development of governance theories and analytical frameworks that emphasise multilevel interactions and adaptation to social-ecological change (Folke et al. 2005, Lockwood et al. 2010, Bennett and Satterfield 2018). For example, adaptive co-management is a governance-oriented approach

for managing complex environmental problems (Carlsson and Berkes 2005, Armitage et al. 2010), and it has been gaining recognition over the past two decades in southern Africa (e.g. Cundill 2010, Thondhlana et al. 2016). Given the shift towards adaptive co-management practice in southern Africa, the approach is increasingly seen as a means for multi-actor collaborations, knowledge-sharing, trust-building and governance through nested institutional structures (Armitage et al. 2008, 2010). Despite the theoretical advantages of adaptive co-management, a number of case studies within southern Africa show that without functioning social networks, resources and authority, adaptive co-management is difficult to realise (e.g. Matose 2006, Kepe 2008, Mannetti et al. 2015).

When new democratic environmental governance approaches emerge in contexts steeped in colonial histories of dispossession and inequality, deep fault-lines remain (often for decades) (Fabricius et al. 2004). For example, the disconnection between people and their ability to fulfil their mandate may cause governance fractures (Cundill and Fabricius 2008). By 'fractures', we refer to stressed, damaged and broken relationships between people and organisations engaged in governance and between the intention and theory of governance and outcome. This term also alludes to the disjuncture between mandates and responsibilities and people's capacities to fulfil them. In most instances, this broken relationship between mandates, capacity and intentions creates a plethora of governance challenges (Child and Barnes 2010). One of the central challenges of all forms of governance is to recognise (a) the right matches between the different institutional scales (formal and informal) at which power resides (Young and Gasser 2002), (b) the physical scales at which real-world problems occur (Ostrom 2009), and (c) the scales at which different pieces of legislation and policy are effective (Ostrom 2010). Failure to recognise and address these contextual nuances can result in scale mismatches (Cumming et al. 2006) in which the system is impaired by weak connections and dysfunctional feedback loops between action and outcomes (O'Higgins et al. 2014). While there has been a substantial focus in social-ecological research on identifying and addressing these challenges (Schoon et al. 2015), the aspect of human agency is often ignored in natural resource discourse.

In general, human agency is the capacity of people and organisations to make choices and decisions (Archer 2000). For this paper, agency is defined as the ability and capacity of natural resource user groups to make decisions, evaluate, and modify local governance elements (institutions, structures and processes). Agency does not occur in a vacuum but is itself influenced by institutions, structures and processes. Dietz and Burns (1992) identified effectiveness, intentionality, autonomy and reflexivity as four key properties that must be met to attribute agency to social actors. The first property, effectiveness, highlights that social actors need to exercise control in changing or maintaining system integrity (Giddens 1984). In changing or maintaining the integrity of systems, Dietz and Burns (1992) suggest that power (whether formal, or through influencing the behaviour of others) is an important attribute in determining the application of rules. In other words, agency can either influence the natural environment directly, or indirectly through the behavioural patterns of other actors. The second property, intentionality, draws attention to the aims and desires of social actors. For agency to be operationalised, actions must be deliberate (Dietz and Burns 1992). However, this does not mean that the implications of intentional acts are always understood or anticipated by social actors. The third property, autonomy, underscores that agency depends on choice. Here autonomy suggests that agency involves voluntary participation and deliberate decision-making (Dietz and Burns 1992). The final property, reflexivity, implies that for agency to be operationalised, social actors need to be aware of the consequences of their actions and practices and monitor the effects of their actions.

Understanding the interplay between social agency and environmental governance may give greater clarity as to where support and investment are most needed, in order to improve governance systems in southern Africa. Despite theoretically sound governance structures in southern Africa, failures in co-management practice have been consistently reported across the region for decades (e.g. Njaya 2007, Cundill 2010). We suspect that while significant attention has been paid to the establishment of governance structures in the region, human agency plays a key and often ignored role in influencing outcomes. Therefore, the central question in this paper is: What role has agency played in the effectiveness of co-management initiatives in southern Africa? We explore the role of agency of natural resource user groups at the community level in determining the effectiveness of co-management,

defined as the success of governance systems in maintaining or improving both ecological and societal system integrity and functioning (Bennet and Satterfield 2018). We first provide an overview of the frameworks we have adopted and of the southern African context, before presenting the methods, results, and a general discussion and conclusion.

5.2 Frameworks for understanding governance-agency interplay over time

We explored the interplay between agency and governance using Archer's (1995) morphostatic/morphogenetic (M/M) framework and the practical framework for understanding the objectives, attributes and elements of environmental governance by Bennett and Satterfield (2018). Archer (1995) utilises the M/M framework to describe a cyclical process of social change, and suggests that social change is a consequence of the interplay between emergent properties of systems (social structure, culture, and people) (Figure 5.1). These properties develop independently but often lead to structural elaborations (morphogenesis) or reproduction (morphostasis). Morphogenesis refers to a state of change, while morphostasis refers to a state of no change, according to Archer (1995), who argues that structures play a critical role in determining social change. In this paper, structures refer to in/formal composition, spatial pattern, and connections between different multilevel organisations (power relations, decision-making, and co-management bodies) (Cumming et al. 2020). In other words, structures organise relations in any society (Boughey and McKenna 2021). Boughey and McKenna's (2021 p. 22) definition of culture refers to a set of "ideas, beliefs, values and concepts that are loosely bound together".

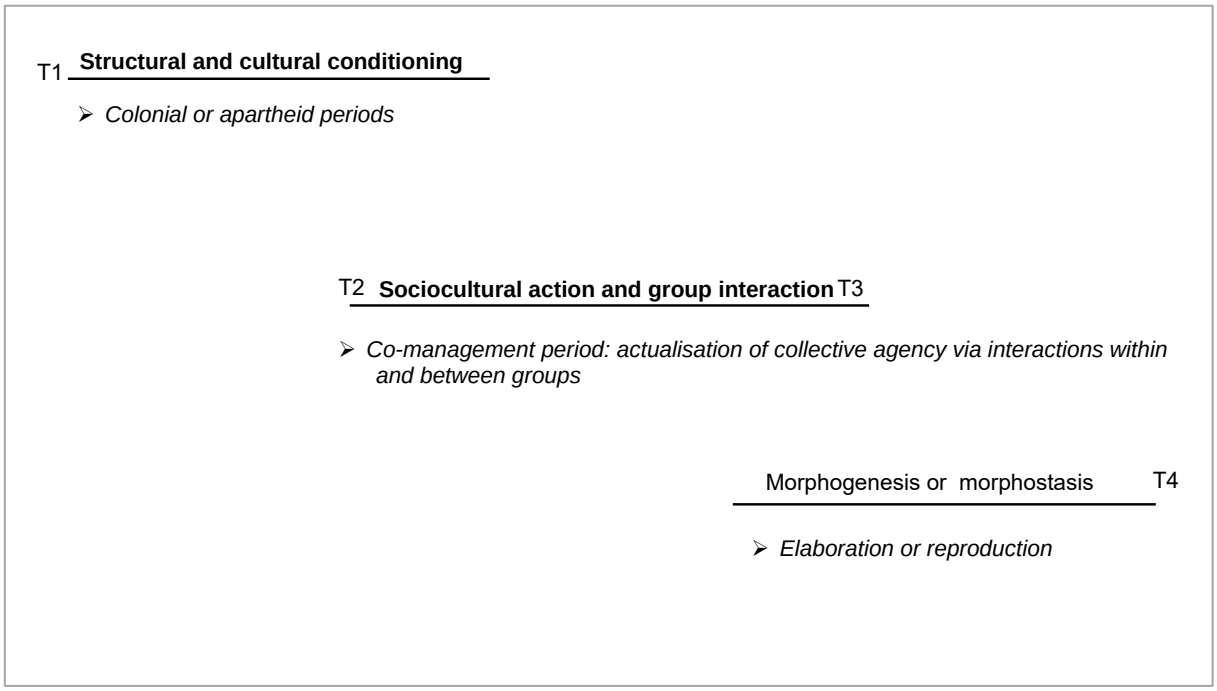


Figure 5.1 The double morphogenetic cycle illustrating the emergence of agency in natural resource governance, adapted from Archer (1995)

The first period is termed T1, and this period describes the existing structures and cultures. In T1, agents are shaped by structures and cultures they find themselves in. Here structural and cultural conditions may enable or inhibit the way they act. At T2-T3, agents interact with structure and culture to pursue their projects, resulting in either elaboration (morphogenesis) or reproduction (morphostasis) of the inherited governance structure at T3-T4. Archer's (2020) M/M framework provides a clear and precise view of the connections linking structures, culture and people; however, no insights are offered into effective governance of natural resources. We therefore applied the framework of Bennett and Satterfield (2018) together with the morphogenesis concept to understand the interplay between governance and agency. We used the Bennett and Satterfield (2018) framework to explore the environmental governance practice between T2-T3 in order to understand how agents interact to pursue their goals in co-management initiatives. Effective governance thus incorporates many structural (e.g. nested structures with horizontal linkages) and functional (e.g. conflict resolution, being prepared for change, information-sharing, rule compliance and enforcement) characteristics. To be operationalised and rendered effective, however, both the structural and functional characteristics depend implicitly on human agency.

5.3 The southern African context

Over the past forty years, the southern African region has experienced rapid environmental and social challenges (Masunungure and Shackleton 2018). Some of these challenges include unpredictable changes in rainfall amount and distribution, land degradation, high levels of sedimentation in water bodies, human-wildlife conflicts, social failure and ineffective governance (Child and Barnes 2010, Borrelli et al. 2017, Stoldt et al. 2020). Coupled with fractured environmental governance systems, these social-ecological challenges are predicted to increase. Colonialism in southern Africa left a legacy of disempowerment. Most indigenous communities were disenfranchised in the governance and management of their environmental resources (Ainslie 1999). For instance, colonial regimes in southern Africa originally declared wildlife and many other natural resources to be the property of the state, even though some of these policies were reversed well before the transition to majority rule.

In many cases, demarcated areas were created for 'black communities' in South Africa, these were termed Bantustans or homelands (King and McCusker 2007), and in then Rhodesia, 'Tribal Trust lands' (Weinrich 2018). In this article, we use the racial terminology common in the southern African region. We use inverted commas to refer to key racial terms such as 'blacks' when referring to indigenous communities, the term 'non-white' to refer to racial groups that were disenfranchised under colonial rule (for example, black, Indian, East Asian and people of mixed heritage), and 'whites' to refer to those of Caucasian origin.

One of the main outcomes of colonialism was to vest mobility and power in those favoured by the colonial authorities, leading to a paralysis of agency in the majority of indigenous groups. Despite the legislative removal of colonial injustices and barriers to the collective agency since the advent of democracy within the southern African states, individual capacity to exercise new freedoms remains severely constrained, and individual agency has often atrophied. For example, the abilities to negotiate effectively with other role-players, agree on rules and processes, and make decisions (and just as importantly, belief in these abilities) are often weak (Nkhata and Breen 2010), not only in community contexts but across

all governance levels, including trans-border government departments (Schoon 2013). This context makes southern Africa an interesting region for exploring the interplay of effective environmental governance and agency.

Where a lack of agency is experienced in conjunction with fractured governance structures and processes, the capacity to take advantage of “windows of opportunity” is reduced (Olsson et al. 2004, Biggs et al. 2008). In Zimbabwe, some government departments that are responsible for environmental decision-making have lost skilled capacity, e.g. the Forestry Commission (Mutekwa and Gambiza 2016). In many cases, officials responsible for enforcing regulations have not been replaced or have been pushed towards a more development-oriented focus. In the conservation of environmental resources, this is exemplified not only by the ideological imperative for community 'beneficiation' through access to and use of natural resources, as shown by the municipal commonage program in South Africa (Davenport et al. 2011), but also in shifts towards co-management throughout the region (Blaikie 2006, Fabricius et al. 2004).

The gap created by the loss of institutions and individuals has seldom been filled, in the face of pressing priorities such as employment creation, provision of housing, sanitation and water supply, and land redistribution. For example, national policies such as the Fast-Track Land Redistribution (FTLR) in Zimbabwe have led to ineffective environmental governance and management (Sibanda et al. 2016). An associated trend has been the large-scale loss of senior and experienced government personnel (Mutekwa and Gambiza 2016). Fractures are also apparent in relationships inside communities and between communities and the local government structures (Schoon 2013, Falayi et al. 2020), which are ultimately responsible for fulfilling state conservation and/or service-delivery mandates. Distrust, unfilled posts and unaligned sectoral planning manifest at all levels in the system. For these reasons, we characterise environmental governance as 'fractured' in the region.

5.4 Methods

To explore the role of agency in the effectiveness of co-management initiatives in southern Africa, we applied Archer's (1995) M/M framework and the practical framework for understanding the objectives, attributes and elements of environmental governance (Bennett and Satterfield 2018).

5.4.1 Selection of case studies

We purposely selected two case studies from two countries within the southern African region where co-management initiatives have been well documented. The two case studies were Machubeni communal lands (South Africa) and state forests in Western Zimbabwe. The case studies are considered comparable as a result of their (a) co-management practices (Cundill and Fabricius 2008, Mutekwa and Gambiza 2016, Falayi et al. 2020), (b) similar structural and cultural conditioning (King and McCusker 2007, Weinrich 2018) and (c) their large indigenous populations (Stats SA. 2011, Mutekwa and Gambiza 2016).

5.4.2 Data collection and analysis

We first synthesised data from peer-reviewed journals, book chapters, institutional reports and policy framework reports. The study followed a two-step data collection process:

1. Secondary data analysis
2. Unstructured discussions with natural resource governance experts

Step one involved analysing data from secondary sources using narrative configurational analysis to describe how actors were involved in different periods of change (Polkinghorne 1995). This analysis was based on the theoretical concepts of the morphogenesis cycle (Archer 1995, Boughey and McKenna 2021). Each case study was considered in relation to Archer (1995):

1. (T1) structural and cultural conditioning

2. (T2-T3) sociocultural action and group interaction
3. (T4) elaboration or reproduction

The morphogenetic cycle for the Machubeni communal land case study was divided into two significant periods: (T1) the apartheid period until the adoption of the expanded public works programme in 2004 and (T2-T3) the co-management period from 2005 to 2021. At the same time, the morphogenetic cycle for the state forests case study was (T1) from the liberation and early independence years until 2000, and (T2-T3) the co-management period from 2001 to 2015. At T4 for both case studies we assessed the extent to which elaboration or reproduction had or had not emerged (Boughey and McKenna 2021). These timescales were selected to show how institutions, structures, processes and agency 'emerge, intertwine and redefine' one another (Archer 1995). This process brought the contextual and historical aspects of agency-governance interplay into focus.

Next, environmental governance practice was assessed based on the Bennett and Satterfield (2018) framework. Environmental governance practice was only analysed for the T2-T3 period because of the actualisation of collective agency via interactions with and between groups during co-management initiatives. Data from peer-reviewed journals, book chapters, institutional and policy framework reports related to each case study were coded based on the four key objectives and 19 attributes of effective governance identified by Bennett and Satterfield (2018). Rating scores were attached to each case study subjectively by the authors, with a rating of 1 meaning very low and five meaning very high.

Step two involved unstructured discussions with eight natural resource governance experts working in individual cases studies (see Appendix 9). Expert consultations enabled us to validate and refine our governance ratings and further elucidate why changes were not observed in the case studies.

5.5 Results

Our analysis of the two case studies showed that the mean rating score of environmental governance practice ranged between very poor and satisfactory (Table 5.1).

Table 5.1 Governance ratings scores[1] for two case studies based on Bennett and Satterfield (2018)

Governance objective	Case study	
	Machubeni communal lands	State forests in Western Zimbabwe
1. **Effective**: Supports maintenance of system integrity and functioning	2	1
2. **Equitable**: Employs inclusive processes and produces fair outcomes	2	1
3. **Responsive**: Enables adaptation to diverse contexts and changing conditions	2	0
4. **Robust:** Ensures functioning institutions persist, maintain performance and cope with perturbations and crises	2	0
Mean rating score	2	0.5

[1]Rating score: 0=Very poor; 1= Poor; 2=Satisfactory; 3=Good; 4=very good: Sources Cundill and Fabricius (2008), Mutekwa and Gambiza (2016), Falayi et al. (2020)

The next section describes the T1 structural and cultural conditioning and the T2 social, cultural actions and group interactions for each of the two case studies.

5.5.1 Case 1: Machubeni communal lands, Eastern Cape, South Africa

(T1) structural and cultural conditioning

Machubeni is situated in the Eastern Cape Province of South Africa and is one of the poorest and most degraded areas in South Africa, with extensive sheet and gully erosion due to overstocking (Shackleton and Gambiza 2008). About 95% of the local population is unemployed. Nearly 49% of households receive a government welfare grant, and 14% receive remittances from family members working outside Machubeni. We identified apartheid laws, top-down institutions, the collapse of traditional leadership, tenure insecurity, forceful removal of 'black' populations to unproductive environments, land degradation, and low levels of trust and motivation as key emergent properties influencing the structural and cultural conditioning of the area (see Bundy 1979, de Wet 1987, Ainslie 1998).

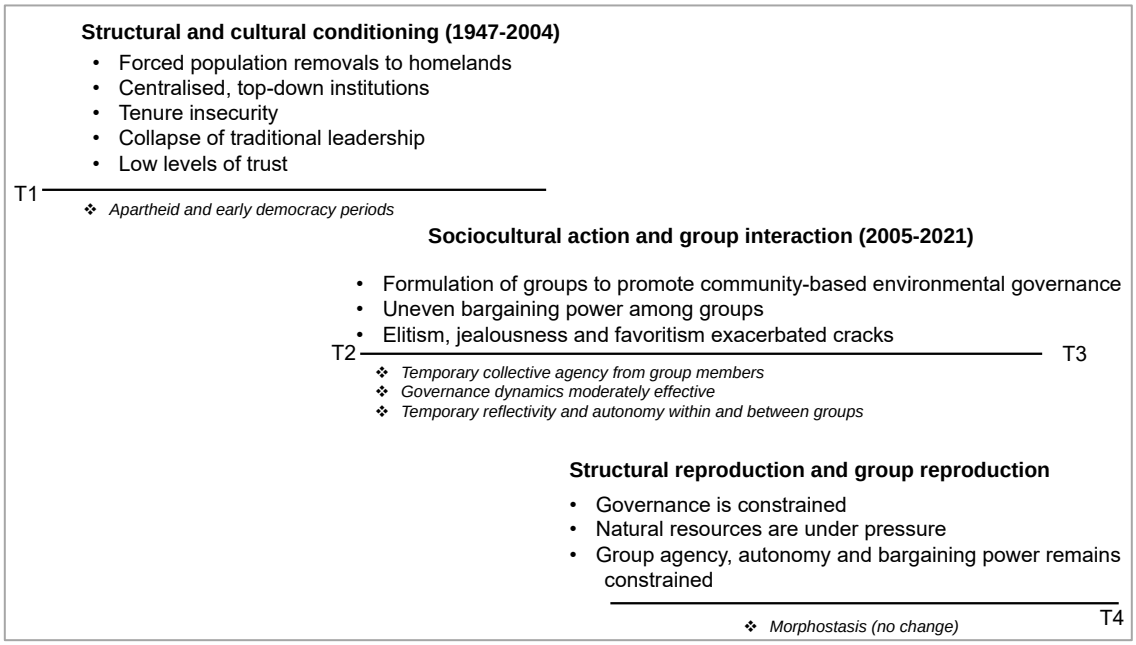


Figure 5.1 Structural and cultural configurations generating the Machubeni communal lands morphogenetic cycles

During the 1960s and 1970s, Machubeni experienced Betterment Planning, which entailed the forced relocation of scattered homesteads into consolidated villages. According to Betterment Planning procedures, village boundaries, arable lands and grazing lands were clearly defined by the state with little or no consultation with the community. Two decades later, the people of Machubeni experienced similar forced relocations when the Machubeni Dam was constructed in 1989 (Cundill 2008). During the construction of the dam, the local community members were not consulted. The people have thus experienced a history of disempowerment in the face of externally driven agendas and processes aimed at land use planning and natural resource governance. Mechanisms to hold actors accountable were found to be lacking during the apartheid period because governance systems were centralised. This led to the collapse of traditional leadership, and local natural resource user groups continued working in silos. The diminishing role of the traditional leadership and ineffective governance in the area led to the degradation of natural resources in the area. The role allocated to the traditional leadership by the apartheid government meant that the state had almost absolute control over the management of natural resources. In some instances, traditional leaders were seen as "enablers" of the apartheid government. This lowered the levels of trust and motivation in Machubeni. Attention to equity and inclusion was essentially absent pre-1994 but has since emerged as a crucial factor for effective governance.

Post-democracy (1994), fragile new governance systems emerged (as discussed below under *evidence of agency*) that proved unresponsive to citizens' dissatisfaction despite considerable external investment in their establishment. Governance practices shifted through time, with an abrupt change at the 1994 democratic elections. However, governance remained ineffective due to functional differences of democratic and traditional structures at the local level, low levels of trust and lack of shared vision. Document review shows that the post-1994 policy vacuum led to ineffective governance in the area (ATS/IKwezi 2004). For example, it took four years for the Municipality Structures Act to be enacted. The act aimed to enhance cross-scale collaboration; however, document review shows that cooperation and multi-actor engagement remained suboptimal (ATS/IKwezi 2004).

(T2-T3) Sociocultural action and group interaction

The first step in the era of democracy was to (re)build local land management institutions that had been eroded and were no longer functioning. Between 2005 and 2020, two externally funded co-management projects were established in Machubeni to promote community-based environmental governance and management. The overarching objectives of the two externally funded projects were to (a) reverse the process of land degradation, (b) enhance polycentricity and build robust institutions and (c) improve agricultural production systems. To enhance the effectiveness of natural resource governance, the community of Machubeni democratically and transparently elected the Project Advisory and Steering Committee (PASC), the Section 21 Company in 2005 and the Masibambisane Multi-actor Forum (MMF) in 2017. The main role of these committees was to agree on the rules for managing key resources and monitoring and enforcing compliance with these rules. The governance bodies were based on a form of management that local people were familiar and comfortable with and incorporated forms of both traditional and democratic governance norms. This shows that local natural resource user groups exercised agency through their engagement with external actors, to facilitate effective governance. The governance bodies were composed of natural resource user groups, researchers and government officials.

The governance bodies were reported to be moderately effective in 2005 and 2017 because the roles, functions and mandates of different agents were clear (Table 5.1). As part of the development process, the community-led institutions received training in a range of skills, including financial management, governance, and different aspects of land management. Consultancy reports analysed show that this training enabled effective coordination of natural resource management in the area. These findings indicate that natural resource users in Machubeni had some sort of efficacy in maintaining system integrity. Furthermore, there was an emergent practice of accountability, as the technical committee presented reports to the PASC (contractors, consultants, development agencies and elected and traditional authorities). These activities thus signified the presence of both reflexivity and autonomy. The impact of the governance bodies on both the individual members of the group and on the positive functioning of the forums itself was initially considerable, with community representatives operating on an equal footing with their external partners. For the first time,

the governance bodies appeared to be taking real responsibility for the management of their natural resources. Document review shows that establishing multi-tiered local governance structures laid the foundation for effective governance and management of natural resources (Cundill 2008). These activities thus reflected the necessary intentionality and reflexivity for agency to be operational.

In 2010 the democratically elected PASC was dominated by members of the ANC (African National Congress), the ruling political party, and consisted of representatives from traditional leaders, the local councillor, and two representatives from each village; similarly in the 2018 elections. Members of the ANC dominated both governance bodies. Although the governance bodies were elected in a democratic process, our analysis shows that there was a lack of independence, given the influence of the ruling party and traditional leaders. The results further show that natural resource user groups such as the youth lacked bargaining power within the governance bodies. These findings indicate that reflexivity and bargaining power of different natural resource user groups differed with the governance bodies at the local scale. Uneven bargaining power amongst the natural user groups led to conflicts. Document review shows that elitism, jealousness and favouritism exacerbated cracks within the governance bodies (Cundill 2008). For example, in 2010, group members of the governance bodies were eventually ejected following the local government election. An independent candidate replaced the incumbent ANC councillor with the subsequent election of a Section 21 company to replace the PASC. As a result, an entirely new set of individuals who had received no training in governance, decision-making, financial management or land management over the preceding years took control of land management in the community. Because of a lack of training in governance, decision-making, and financial management, the 2010 committee collapsed in 2015. In 2018, new members of the governance body were selected, and the majority of the members were from the 2010 structures. This meant that ANC members dominated the 2018 governance body. Unfortunately, governance challenges such as lack of trust, collaborative fatigue and functional incompatibility of democratic and traditional structures at the local level emerged. In a move to prevent elections in 2019, power-hungry individuals within the Masibambisane Multi-stakeholder Forum executive amended the constitution as a way of avoiding leadership change. This further fractured the

governance groups, and most youth and women who challenged the amendment were deliberately excluded from the project activities. In 2020, the Masibambisane Multi-stakeholder Forum executive used the COVID-19 lockdown regulations as a mechanism to stop the election of the new executive. The failure to hold periodic elections led to the youth resigning from the governance group.

T4 Structural reproduction and group reproduction

The results show that the structural and cultural configurations in Machubeni have reproduced and maintained the system's current forms (morphostasis) (Figure 5.2), in that governance is still constrained, and natural resources are under pressure. The absence of some elements of adaptive governance (conflict-resolution mechanisms, effective rule compliance and enforcement, appropriate infrastructure, and people and organisations being prepared for change) may have contributed to this. Furthermore, it appears that the governance structures were not sufficiently robust to support such agency, and their inherent weaknesses, which manifested in their fracturing, ultimately undermined agency (Table 5.1).

Additionally, it appears that governance is compromised by competing agencies, for example, the traditional leaders and the Masibambisane Multi-stakeholder Forum executive. The findings indicate that the bargaining power of primary agents (e.g. youth and women natural resource groups) is minimal and in some cases, it appears to be extrinsic. Although the results show that the structural and cultural configurations may have reproduced and maintained the fractures, our analysis shows that new ways of thinking about agency-governance interplay emerged.

5.5.2 Case 2: State forests in Western Zimbabwe

(T1) structural and cultural conditioning

This study shows how institutional fractures in forest governance have affected the conservation of forest resources in six state forests in Western Zimbabwe. In 1957, through the Forest Act (Cap 19:05), the Forestry Commission of Zimbabwe was established with a vision to conserve and protect all forest resources for the socio-economic development of

Zimbabwe. This includes the governance and management of all state and communal forests. These forests were gazetted to protect and conserve valuable timber and wildlife habitat. In Western Zimbabwe, state forests are subdivided into two groups: those which have ex-situ inhabitants (Kazuma, Pandamasuie and Fuller) and those which have in-situ inhabitants (Gwaai, Mbembesi and Gwampa).

During the gazettement of the Gwaai, Mbembesi and Gwampa forests, indigenous inhabitants were evicted, resulting in conflicts between forest management authorities and the locals. Despite the commercial importance of state forests in Western Zimbabwe, poor governance arrangements led to the slow degradation of forest resources in the 1970s.

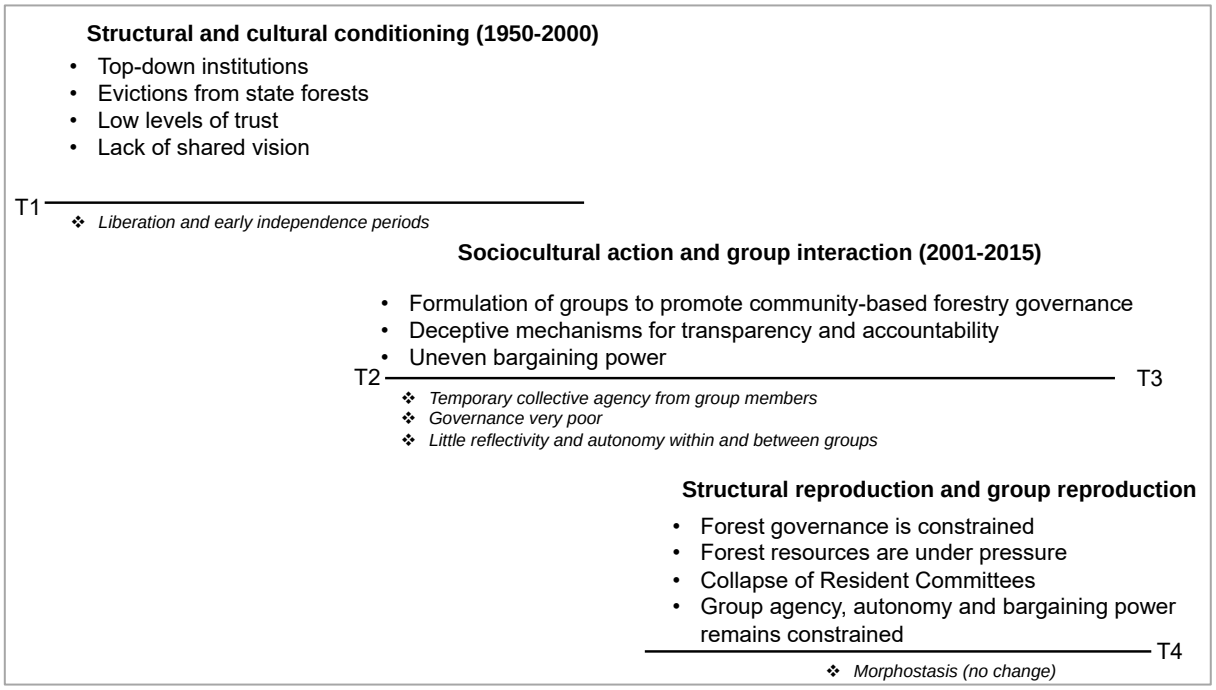


Figure 5.2 Structural and cultural configurations generating the state forests' morphogenetic cycles

During the liberation war in the 1970s, governance of the state forests was reported to be put on hold, since Forestry Commission personnel had retreated to urban areas due to security fears. The governance arrangements were dominated by a top-down approach that excluded the local communities. Rule enforcement and transparency were reported to below. However, the achievement of independence in 1980 saw the improvement of governance

and management of forest resources. Due to the newfound freedom brought about by independence, local people's rights were respected. Despite this newfound freedom, those resident in the state forest were evicted again by the Forestry Commission with the assistance of state agencies in the 1990s. The prime reason for the evictions was to regulate and conserve timber extraction. The displaced people were left with no farming and grazing land. The lives of the forest inhabitants were greatly affected in that their livelihoods were eroded. Apart from the erosion of livelihoods, religious practices were greatly affected because forest inhabitants could not perform their rituals.

The Economic Structural Adjustment Programme (ESAP) introduced between 1990 and 1995 resulted in reduced government funding to the Forestry Commission. This greatly affected the functional networks that facilitated forest management. During the same period, there were high numbers of timber poachers and incidences of veld fires reported. Due to reduced funding, the government hired inexperienced young forest managers who had no skills to govern and manage state forests effectively. After realising that the Forestry Commission could not manage state forest resources, local communities returned to the forests, and new settlements emerged. Forest inhabitants were left unharassed for political reasons, as the ruling party wanted to consolidate power in rural areas. Document review shows that forest resources continued to degrade due to ineffective governance, and local communities were contesting state control of forests on the grounds of historical occupation (Mutekwa 2016).

(T2-3) sociocultural action and group interaction

After the realisation that centralised and state-controlled government was ineffective, the Forestry Commission shifted towards Shared Forest Management (SFM) in the late 1990s. This initiative was similar to adaptive co-management. The main aim of the SFM was to (a) build functional networks, (b) enhance shared forest management, (c) enhance multi-actor participation and (d) enable joint sharing of forest benefits between the state and forest inhabitants. To operationalise SFM, Resident Committees of forest dwellers were formed. The main purpose of Resident Committees was to enhance resource management and to monitor and enforce compliance with rules. Forest dwellers democratically elected the Resident

Committees members; however, politicians and the Forestry Commission influenced the outcome. The multi-tiered forestry governance was composed of Resident Committees, traditional village head, Forestry Commission and Rural District Council (RDC). As shown here, Resident Committees exercised corporate agency in the multi-tiered governance system.

Despite the introduction of Resident Committees and a multi-tiered governance system, document review shows that the quality of environmental governance remained very poor (Mutekwa and Gambiza 2016, Table 5.1). Lack of genuine intent by the Forestry Commission to share power was identified as a key challenge inhibiting agency. For example, the provisions of the resource management constitution highlighted that local communities were only represented through the lower and middle hierarchal levels. Only government and senior project actors were mandated to make key decisions. Furthermore, the constitution-making process was regarded as a tick-box exercise because it limited transparency, and the exclusive mandate of the Forestry Commission was protected. The Forestry Commission was only accountable to the Ministry of Environment and Tourism and not the local communities. Lack of skills and capacity development (i.e. conflict-resolution, financial management and forest management) of Resident Committees was reported to have perpetuated ineffective coordination and management of forestry resources. The rules for collaboration were formulated by the Forestry Commission and later imposed on locals. Documents reviewed show that in some instances, rules of engagement were written in English and were beyond the comprehension of RCs (Mutekwa and Gambiza 2016).

Furthermore, the Resident Committees relied on the Forestry Commission to organise and take minutes during meetings. This indicates that the Forestry Commission deliberately restricted the agency of Resident Committees. Thus, the restriction of agency inhibited the devolution of forestry governance. The agentic action of forest dwellers fizzled out as it became clear that no power had been devolved on them. Again, aspects of reflection and reflexivity were reported to be absent in the shared management processes. Although there were attempts by the Forestry Commission to devolve the governance and management of forests, the provisions of the RCs' constitution and direct interventions from the government played a critical role in inhibiting the devolution of decision-making processes. For example,

the uneven sharing of power and revenues to local communities by the Forestry Commission was clear evidence of fractured forestry governance (Table 2). The limited provisions of power given to local communities was an indication that power was mainly vested with the Forestry Commission. We identified a lack of community empowerment as one of the key barriers that inhibited effective devolution.

Furthermore, lack of empowerment and agency led to the collapse of the co-management schemes due to poor management skills. For example, funds were diverted for personal gains by individuals within the communities. This compromised the intended devolution of decision-making processes. In the early 2000s the introduction of the Fast-Track Land Reform Programme (FTLRP) exacerbated lawlessness within state forests and ultimately resulted in the collapse of rule enforcement and co-management initiatives. Furthermore, the agentic action of actors was further limited by the post-2000 economic conditions, which were characterised by high inflation. The harsh economic conditions affected conservation activities, veld fire management initiatives and anti-poaching patrols due to limited funding of the Forestry Commission. Due to unconducive policies and legislative environment, post-2000 governance arrangements were difficult to determine. It appears that several socio-economic and political factors compromised the governance of state forests. Document review shows that post-2000, several government authorities were competing for legitimacy concerning forest management (Mutekwa and Gambiza 2016, 2017). Due to policy changes, four dominant actor groups emerged: the Resident Committees, Forestry Commission, Rural District Council (RDC) and Environmental Management Agency (EMA). This highlights the compromising of governance by competing agencies.

T4 Structural reproduction and group reproduction

The structural and cultural configurations generating the state forests morphogenetic cycles show that the system has maintained its current form (morphostasis) (Figure 5.2). Our analyses reveal that the lack of transparency and accountability may have restrained agency, resulting in structural group reproduction (Figure 5.2). The absence of genuine intent to share power may have contributed to the collapse of Resident Committees; this constrained group agency, autonomy and bargaining power of the RCs. Furthermore, a lack of interpersonal

relationships among the governance made it difficult for Resident Committees to make changes in forest resource distribution. These fractures have worsened forest resource degradation (Table 5.2).

Table 5.2 Governance fractures and their impacts on expression of agency, in the two case studies

Case	Governance fractures	Expressions of agency that undermine environmental governance	Expressions of agency that are positive for environmental governance
● Machubeni case study	● A long history of active alienation from land management decision-making ● Distrust within the community and between the community and outside actors ● Failure of developmental projects	● Strong democratic ethos post-1994, used to affirm the power of certain groups. ● Absence of existing skilled individuals in the community, or recognition of their skills ● High turnover of government actors.	● Broader levels of participation through multi-actor forums ● Better connectivity amongst local actors
● State Forests in Western Zimbabwe	● Reduction of forestry conservation funding from government ● Eviction of indigenous inhabitants ● Lack of rule enforcement	● Local-level agency suppressed by top-down conservation practices ● Forest resource degradation ● Illegal logging of timber	● Increased opportunities for social learning

Examples of governance fractures included a disjuncture between mandates and capacity to fulfil them, lack of rule enforcement, damaged relations between stakeholders,

distrust among key actors, lack of devolution of responsibilities to people managing resources, and scale mismatches between centralised institutions and resource management (Table 5.2). Lack of skills and capacity and suppression of local-level agency by centralised controls undermined the expression of agency. The net effects of governance fractures and lack of agency were natural resource degradation, lack of infrastructure maintenance, increase in human-wildlife conflicts, and resource capture by local elites. Positive outcomes of strengthened agency included increased cross-border collaboration and coordination, better connectivity amongst actors, and increased levels of participation and social learning (Table 5.2).

5.6 Discussion

Our analysis of the governance-agency interplay shows how agency can be central to the relationships between structure and function in co-management settings. The morphogenetic models reconstructed for this paper imply that the Machubeni and state forest case studies are at an early phase of developing agency, with a greater overlap in capacity and structure needed before effective governance becomes embedded at the beginning of a new morphogenetic cycle. Our findings suggest that an emphasis on structural elements of governance, such as multi-scale institutional arrangements, is necessary for effective environmental governance (Bennett and Satterfield 2018) but not on its own sufficient in the southern African context. Southern Africa is characterised by a long history of active disempowerment of actors (e.g. Nkhata and Breen 2010), inequalities (King and McCusker 2007), unaligned planning and capacity shortages at all scales (Cundill and Fabricius 2008). Critical aspects of agency thus emerge as key considerations for effective governance in this region (Dietz et al. 2003). We doubt that this need is unique to southern Africa, but we hope that this paper will initiate dialogue on the role of agency in environmental governance. Further governance research from developing countries or post-colonial regions is needed to improve and deepen our understanding of how to include the critical aspects of agency in the evolution and design of effective governance systems.

Agency interacts with social structure in unpredictable ways (Archer 1995). In our study, elements of governance such as institutions, structures and processes led to both

positive and negative expressions of agency. For example, in the state forests case, we identified elite capture, degradation of natural resources and illegal logging of timber as negative expressions of agency (Mutekwa and Gambiza 2016). The same is true for social or governance structures, which may either enable or constrain agency (the ability of people to take action), for example, in the Machubeni case study (Cundill and Fabricius 2008),agency was undermined when community members ejected the trained individuals from the multi-actor governance structure as a way of affirming new power relationships in the community. Despite the unpredictable interplay of these two factors, a failure to consider agency in the pursuit of effective governance can have serious consequences.

Our results show that fractures in governance play out in several different ways in southern Africa, and that history is important in providing a clearer view of emergent properties. As highlighted in this analysis, some of the fractures in governance are linked to historical events. These include flawed and/or conflicting legislation; lack of agency within implementing departments (Forestry Commission) (Mutekwa and Gambiza 2016), and marginalisation of communities that were deliberately excluded from participating in decision-making and who are now required to participate in environmental governance (e.g. Machubeni) (Cundill and Fabricius 2008). We argue that historical lenses are important in explaining contemporary practice and outcomes (Tekwa et al. 2019). The results show that the multi-tiered governance systems are shaped by organisational history in both case studies. For example, some of the governance challenges related to historical legacies include disempowerment and current capacity shortages, arising through the loss of skilled individuals at multiple levels (e.g. Cundill and Fabricius 2008, Fabricius and Cundill 2010,Mutekwa and Gambiza 2016, Falayi et al. 2020).

Our study was based on secondary sources of data; therefore, two key limitations invite further research. First, in-depth empirical case studies are needed to analyse the emergence of agentic action in changing contexts. Second, given the growing interest in system transformation and the role of agency in such processes, future studies are needed to further explore how emergent properties can enhance or inhibit agency in multi-tiered governance systems. Additionally, we should pay attention to which forms of agency might

be required and how we might factor consideration of agency into our conceptual and practical frameworks for improved governance.

5.7 Conclusion

This article contributes to the growing body of scholarship on environmental governance and management by illustrating how structural and functional improvements alone are inadequate to shift governance arrangements towards greater improved effectiveness in southern Africa. Our analysis illustrates that agency is a central aspect of governance systems, one that deserves attention going forward. However, fractures such as historical legacies of disempowerment, lack of capacity within implementing departments, and conflicting mandates play a critical role in influencing co-management initiatives in southern Africa. While these findings need to be validated within other contexts, we argue that building agency across scales is critical in post-colonial governance contexts, as well as paying attention to the ways in which fractures in governance structures may impede the expression of agency. Close attention to agency can enhance opportunities in the future for building resilient governance structures adaptable to fast-changing social, economic and environmental arrangements.

5.8 References

Ainslie, A. 1999. When 'community' is not enough: Managing common property natural resources in rural South Africa. *Development Southern Africa* 16(3):375–401.

Archer, M. S. 1995. *Realist Social Theory: The Morphogenetic Approach*. Cambridge University Press.

Archer, M. S. 2000. *Being Human: The Problem of Agency*. Cambridge University Press.

Armitage, D., F. Berkes, and N. Doubleday. 2010. *Adaptive co-management: collaboration, learning, and multi-level governance*. UBC Press.

Armitage, D., M. Marschke, and R. Plummer. 2008. Adaptive co-management and the paradox of learning. *Global environmental change* 18(1):86–98.

ATS/Ikwezi. 2004. Machubeni land use plan assessment report. *Rhodes University* (1):1–56.

Bennett, N. J., and T. Satterfield. 2018. Environmental governance: A practical framework to guide design, evaluation, and analysis. *Conservation Letters* 11(6):e12600.

Biggs, H. C., C. M. Breen, and C. G. Palmer. 2008. Engaging a Window of Opportunity: Synchronicity between a Regional River Conservation Initiative and Broader Water Law Reform in South Africa. *International Journal of Water Resources Development* 24(3):329–343.

Blaikie, P. 2006. Is Small Really Beautiful? Community-based Natural Resource Management in Malawi and Botswana. *World Development* 34(11):1942–1957.

Borrelli, P., D. A. Robinson, L. R. Fleischer, E. Lugato, C. Ballabio, C. Alewell, K. Meusburger, S. Modugno, B. Schütt, V. Ferro, V. Bagarello, K. V. Oost, L. Montanarella, and P. Panagos. 2017. An assessment of the global impact of 21st century land use change on soil erosion. *Nature Communications* 8(1):2013.

Boughey, C., and S. McKenna. 2021. *Understanding Higher Education: Alternative Perspectives – African Minds*. African Minds, Cape Town, South Africa.

Bundy, C. 1979. *The Rise and Fall of the South African Peasantry*. University of California Press.

Carlsson, L., and F. Berkes. 2005. Co-management: concepts and methodological implications. *Journal of Environmental Management* 75(1):65–76.

Child, B., and G. Barnes. 2010. The conceptual evolution and practice of community-based natural resource management in southern Africa: past, present and future. *Environmental Conservation* 37(3):283–295.

Cumming, G. S., D. H. M. Cumming, and C. L. Redman. 2006. Scale Mismatches in Social-Ecological Systems: Causes, Consequences, and Solutions. *Ecology and Society* 11(1).

Cumming, G. S., G. Epstein, J. M. Anderies, C. I. Apetrei, J. Baggio, Ö. Bodin, S. Chawla, H. S. Clements, M. Cox, L. Egli, G. G. Gurney, M. Lubell, N. Magliocca, T. H. Morrison, B. Müller, R. Seppelt, M. Schlüter, H. Unnikrishnan, S. Villamayor-Tomas, and C. M. Weible. 2020. Advancing understanding of natural resource governance: a post-Ostrom research agenda. *Current Opinion in Environmental Sustainability* 44:26–34.

Cundill, G. 2010. Monitoring Social Learning Processes in Adaptive Comanagement: Three Case Studies from South Africa. *Ecology and Society* 15(3).

Cundill, G. 2008. Learning, governance and livelihoods: Toward adaptive co-management under resource poor conditions in South Africa. PhD Thesis, Rhodes University, Makhanda.

Cundill, G., and C. Fabricius. 2008. *Adaptive co-management under resource-poor conditions: Lessons from South Africa.* In Exploring Sustainability Science: A Southern African Perspective. Burns, S., Weaver, A., Eds. Sun Press: Stellenbosch, South Africa.

Davenport, N. A., J. Gambiza, and C. M. Shackleton. 2011. Use and users of municipal commonage around three small towns in the Eastern Cape, South Africa. *Journal of Environmental Management* 92(6):1449–1460.

de Wet, C. 1987. Betterment planning in South Africa: Some thoughts on its history, feasibility, and wider policy implications. *Journal of Contemporary African Studies* 6(1–2):85–122.

Dietz, T., and T. R. Burns. 1992. Human Agency and the Evolutionary Dynamics of Culture: *Acta Sociologica*.

Dietz, T., E. Ostrom, and P. C. Stern. 2003. The struggle to govern the commons. *Science* 302(5652):1907–1912.

Fabricius, C., and G. Cundill. 2010. Building Adaptive Capacity in Systems Beyond the Threshold: The Story of Machubeni, South Africa. *Adaptive Capacity and Environmental Governance*:43–68.

Fabricius, C., E. Koch, S. Turner, and H. Magome. 2004. *Rights Resources and Rural Development: Community-based Natural Resource Management in Southern Africa*. Routledge.

Falayi, M., J. Gambiza, and M. Schoon. 2020. Unpacking Changing Multi-Actor and Multi-Level Actor Ties in Transformative Spaces: Insights from a Degraded Landscape, Machubeni, South Africa. *Land* 9(7):227.

Folke, C., T. Hahn, P. Olsson, and J. Norberg. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources* 30(1):441–473.

Giddens, A. 1984. *The Constitution of Society: Outline of the Theory of Structuration*. University of California Press.

Graham, J., B. Amos, and T. W. Plumptre. 2003. *Governance principles for protected areas in the 21st century*. Institute on Governance, Governance Principles for Protected Areas.

Kepe, T. 2008. Land Claims and Comanagement of Protected Areas in South Africa: Exploring the Challenges. *Environmental Management* 41(3):311–321.

King, B. H., and B. McCusker. 2007. Environment and Development in the former South African Bantustans. *The Geographical Journal* 173(1):6–12.

Lockwood, M. 2010. Good governance for terrestrial protected areas: A framework, principles and performance outcomes. *Journal of environmental management* 91(3):754–766.

Lockwood, M., J. Davidson, A. Curtis, E. Stratford, and R. Griffith. 2010. Governance Principles for Natural Resource Management. *Society & Natural Resources* 23(10):986–1001.

Mannetti, L. M., K. J. Esler, A. T. Knight, and K. Vance-Borland. 2015. Understanding Social Networks to Improve Adaptive Co-Governance with the ≠Khomani Bushmen of the Kalahari, South Africa. *Human Ecology* 43(3):481–492.

Masunungure, C., and S. E. Shackleton. 2018. Exploring Long-Term Livelihood and Landscape Change in Two Semi-Arid Sites in Southern Africa: Drivers and Consequences for Social–Ecological Vulnerability. *Land* 7(2):50.

Matose, F. 2006. Co-management options for reserved forests in Zimbabwe and beyond: Policy implications of forest management strategies. *Forest Policy and Economics* 8(4):363–374.

Mutekwa, V. T., and J. Gambiza. 2017. Forest protected areas governance in Zimbabwe: Shift needed away from a long history of local community exclusion. *Journal of environmental management* 198:330–339.

Mutekwa, V. T., and J. Gambiza. 2016. Assessment of governance principles application in forest protected areas: the case of six state forests in western Zimbabwe. *International Forestry Review* 18(4):466–484.

Nkhata, B., and C. Breen. 2010. Performance of community-based natural resource governance for the Kafue Flats (Zambia). *Environmental Conservation* 37(3):296–302.

Njaya, F. 2007. Governance Challenges of the Implementation of Fisheries Co-Management : Experiences from Malawi. *International Journal of the Commons* 1(1):137–153.

O'Higgins, T., A. Farmer, G. Daskalov, S. Knudsen, and L. Mee. 2014. Achieving good environmental status in the Black Sea: scale mismatches in environmental management. *Ecology and Society* 19(3).

Olsson, P., C. Folke, and T. Hahn. 2004. Social-ecological transformation for ecosystem management: the development of adaptive co-management of a wetland landscape in southern Sweden. *Ecology and society* 9(4).

Osei-Tutu, P., M. Pregernig, and B. Pokorny. 2015. Interactions between formal and informal institutions in community, private and state forest contexts in Ghana. *Forest Policy and Economics* 54:26–35.

Ostrom, E. 1994. *The meaning of American federalism.* Institute for contemporary studies Press., San Francisco, CA.

Ostrom, E. 2009. *Understanding Institutional Diversity*. Princeton University Press.

Ostrom, E. 2010. Beyond Markets and States: Polycentric Governance of Complex Economic Systems. *American Economic Review* 100(3):641–672.

Polkinghorne, D. E. 1995. Narrative configuration in qualitative analysis. *International Journal of Qualitative Studies in Education* 8(1):5–23.

Shackleton, C. M., and J. Gambiza. 2008. Social and ecological trade offs in combating land degradation: the case of invasion by a woody shrub (Euryops floribundus) at Macubeni, South Africa. *Land degradation & development* 19(4):454–464.

Schoon, M. 2013. Governance in Transboundary Conservation: How Institutional Structure and Path Dependence Matter. *Conservation and Society* 11(4):420.

Schoon, M. L., M. D. Robards, C. L. Meek, and V. Galaz. 2015. Principle 7 – Promote polycentric governance systems. *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems*:226–250.

Sibanda, M., T. Dube, T. Mubango, and C. Shoko. 2016. The utility of earth observation technologies in understanding impacts of land reform in the eastern region of Zimbabwe. *Journal of Land Use Science* 11(4):384–400.

Stats SA. 2011, February 2. Statistics by place, Emalahleni Local Municipality. Pretoria.

Stoldt, M., T. Göttert, C. Mann, and U. Zeller. 2020. Transfrontier Conservation Areas and Human-Wildlife Conflict: The Case of the Namibian Component of the Kavango-Zambezi (KAZA) TFCA. *Scientific Reports* 10(1):1–16.

Tekwa, E. W., E. P. Fenichel, S. A. Levin, and M. L. Pinsky. 2019. Path-dependent institutions drive alternative stable states in conservation. *Proceedings of the National Academy of Sciences* 116(2):689–694.

Thondhlana, G., G. Cundill, and T. Kepe. 2016. Co-Management, Land Rights, and Conflicts Around South Africa's Silaka Nature Reserve. *Society & Natural Resources* 29(4):403–417.

Weinrich, A. K. H. 2018. *African Farmers in Rhodesia: Old and New Peasant Communities in Karangaland*. Routledge.

Young, O. R., and L. Gasser. 2002. *The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale*. MIT Press.

Chapter 6: Synthesis, reflections and recommendations

6.1 Synthesis

Given that this thesis is structured in a paper format, much of the results have already been discussed in chapters 2, 3, 4 and 5. This chapter therefore summarises the key findings relevant to each research question as outlined in section 1.3, chapter 1 (Table 6.1).

Table 6.1 Key findings

Reference	Research Questions	Finding
Chapter 2	1. How have governance challenges manifested in natural resource management between 2010 and 2020 in southern Africa?	The results from the scoping review reveal that governance challenges relating to the maintenance of system integrity and functioning were the most mentioned, followed by challenges relating to equitability, institutional robustness, and responsiveness.
Chapter 3	2a. How were the governance objectives and attributes applied per historical period and what were the influencing factors? 2b. What key factors (drivers) influenced rangeland condition over time in Machubeni?	The results show that residual impacts of history are still visible and widely felt to date, despite the redressing of the apartheid policies. Furthermore, the results show that the application of governance objectives varied through time while rangeland condition gradually deteriorated through time. The results show that direct state intervention played a critical role in determining the application of governance objectives and attributes. Again, evidence from chapter 3 shows that key drivers such as direct state intervention, overstocking, population size, and lack of livelihood options have played a key role in determining rangeland condition over time

Chapter 4	How have multi-actor ties changed since the external investment in landscape governance and management in Machubeni, South Africa?	A social network analysis showed that the proportion of strong ties gradually increased over time across three governance networks (i.e. common goals, information-sharing and inter-organisational trust), while multi-level linkages between local organisations and the local municipality remained weak due to lack of trust and collaborative fatigue.
Chapter 5	What role has agency played in the effectiveness of co-management initiatives in southern Africa?	The results show that despite careful design and implementation of co-management approaches in Machubeni (South Africa) and Zimbabwe, the absence of some elements of adaptive governance reduced support for the development of individual and collective agency.

Below I summarise the key findings, theoretical insights, policy, and practical implications of the findings from the individual results chapters (chapters 2, 3, 4 and 5). Each individual chapter is discussed in detail below.

6.2 Reflections and recommendations

6.2.1 Research question 1 (Chapter 2)

Evidence from this research supports the first proposition that was posed for this study, namely "governance challenges limit the capacity for natural resource systems to deliver environmentally and socially sustainable outcomes.". Based on the insights of chapter 2, it can be concluded that natural resource governance concerns remain a key challenge in southern Africa. Furthermore, this chapter reveals the need for more research on governance systems. It was shown in chapter 2 that governance challenges related to the maintenance of system integrity and function were the most reported in literature, while governance challenges related to the adaptability and flexibility of institutions were the least mentioned; this insight might mean that governance research in southern Africa is heavily focused on

identifying normative or procedural elements such as issues related to participation and recognition. Furthermore, the scoping review showed that, consistent with the study of Potts (2020), governance attributes such as anticipatory learning, monitoring, innovation and adaptive governance are poorly studied in the region; therefore better understanding of the barriers affecting anticipatory learning, monitoring and innovation is required. This can be achieved by evaluating or analysing governance dynamics using recent comprehensive frameworks (e.g., Graaf et al. 2017, Bennett and Satterfield 2018).

Throughout the scoping review (*refer to chapter 2*) analysis, lack of funding, leadership, leakages of human capital and tenure insecurity were the most recurrent themes affecting governance across scales. Of these themes, lack of funding appeared across the 135 articles. This highlights that adequate funding is core to the maintenance of system integrity and function of governance systems in southern Africa. Furthermore, lack of funding was connected to leakages of human capital and limited capacity to implement strategic solutions. Therefore there is a need to develop sustainable landscape financing strategies that can provide the funding necessary to enable effective governance. This includes promoting long-term partnerships with local and international agencies (Nelson 2009). For example in Machubeni South Africa, there is evidence of small-scale long-term investment, aligned to local interest, through the United Nations Development Program (UNDP) small grants initiatives, and the LandCare program led by the Department of Rural Development and Agrarian Reform (DRDAR) (see Falayi et al. 2021). Apart from lack of funding, the review also illustrated that there were inadequate policies that safeguard people's rights and tenure within the region (*also refer to chapter 3*).

While chapter 2 provided a first attempt to identify and analyse governance challenges in the region using Bennett and Satterfield's (2018) framework, I suggest that it is necessary to further explore why governance systems mature at different rates in the region (Potts 2020). Further research, using topic modelling, is recommended, in order to explore the evolution of environmental governance in southern Africa. A scoping review based on topic modelling and human-coded analysis would enable us to track the evolution of environmental governance in more detail. Automated literature reviews based on topic

modelling have been widely used to synthesise literature in sustainability studies (e.g. Rocha et al. 2020). Therefore future research should aim to use automated literature review techniques in exploring governance dynamics in literature.

Based on the findings from chapter 2, I make the following recommendation for practice: Policymakers, practitioners and researchers are urged to use expanded governance toolkits or frameworks when designing, analysing and evaluating environmental governance. Expanded governance toolkits or frameworks are important because they are comprehensive and can be used to adequately explore and address the challenges of sustainable development (see Graaf et al. 2017, Kusters et al. 2020).

6.2.2 Research question 2 (Chapter 3)

Chapter 3 has chronicled how governance dynamics and rangeland condition have changed between 1947 and 2017. In chapter 1 of this study, it was proposed that "rangeland resource degradation is driven by casual factor synergies, of which the most prominent is poor governance". The findings from Machubeni show that this proposition is largely true. Based on the insights of chapter 3, it can be concluded that governance dynamics and rangeland condition have changed over time due to complex drivers of change interacting at different scales. Results illustrate the importance of learning from history because current governance and rangeland challenges in Machubeni are linked to the history of the area, 'the ghost of environmental history'. For example the ineffectiveness of current governance structures and the degradation of rangelands can be linked to the policies of the apartheid government. The Machubeni case study is a powerful reminder of how apartheid policies have influenced governance dynamics and rangeland condition over time. The study shows that the lack of attention by policymakers and politicians to the impacts of historical injustices has inhibited equitable environmental governance over time despite the redressing of apartheid policies. This lack of attention to the impacts of historical injustices on local communities is widely reported in the region (Bennett 2013, Mutekwa and Gambiza 2017).

Furthermore, the findings of chapter 3 illustrate the shortcomings of the post-apartheid policies on enabling effective governance. For example, the study highlights the

continued exclusion of certain groups in natural resource management (i.e. youth and women), absence of adaptive governance elements and continued exclusion of traditional leaders in developmental issues. Furthermore, the study illustrates that there are new forms of inequality brought on by intra-village conflicts and poverty. These findings illustrate the need for strengthening social capital and enhancing human agency. The strengthening of social capital and the development of individual and group agency would be contributing factors in building effective governance networks that could enhance community cohesion, collaboration and knowledge-sharing (Cohen et al. 2012, Falayi et al. 2020). This can be achieved by developing and organising transformative spaces (Pereira et al. 2018) or multi-actor forums (Sarmiento Barletti et al. 2020). These spaces for collaborative governance are essential in enabling co-learning and cross-scale engagement (*refer to chapter 4*).

Although the application of governance objectives varied through time (*refer to chapter 4*), the study illustrates that rangeland condition has gradually declined over time. My findings are consistent with the results of Palmer and Bennett (2013): that rangelands under a common management regime are experiencing transformation due to different drivers of change. The historical perspective used in the study enabled me to identify the key complex social, ecological and economic drivers at play. Key to these drivers is the increase of the livestock numbers, population size (Stats SA. 2011) and lack of livelihood options (ATS/Ikwezi. 2004). These drivers illustrate how environmental challenges are complex (*refer to chapter 2*). Therefore in order to reverse the current rates of rangeland degradation in Machubeni, effective governance and management alone is inadequate. It is therefore logical to introduce the concept of Sustainable Land Management and restoration in the area (see Stringer and Dougill 2013). Furthermore there is a need to fence the rangeland camps in Machubeni. Fencing is key to achieving resource control and access in the area (see Bennett 2010). Based on the evolution of governance dynamics and rangeland condition in Machubeni, it is recommended to rethink the issue of whether current governance systems should move towards a genuine co-management approach. Politicians, policymakers and other actors are advised to develop laws and policies that safeguard the rights of locals. Furthermore, I urge politicians and relevant actors to expedite the process of land restitution in Machubeni. This is key in addressing past wrongs in the area.

6.2.3 Research question 3 (Chapter 4)

Based on the insights of chapter 4, it can be concluded that collaborative spaces, such as transformative spaces, play a critical role in enhancing multi-actor participation (Reed 2008), learning (Berkes 2009), trust building (Newell and Swan 2000) and a culture of innovation (Chaffin et al. 2016). These insights maybe used to support efforts in collaboration and multi-actor engagement in southern Africa. Furthermore chapter 4 illustrates the importance of building and nurturing inter-organisational trust. The results show that the lack of inter-organisational trust between the local municipality and local hubs inhibited knowledge-sharing. The relative weakness of the ties between the local municipality and other hubs within the network causes institutional capacity constraints that limit the ability of the local municipality departments to deliver their mandate (*refer to chapter 4*). This insight highlights the need for improving the institutional capacity of local municipalities in South Africa.

Another key insight emerging from chapter 4 is that transformative spaces enable the culture of reflection. In the Machubeni case study, actors reflected and identified key barriers to effective collaboration and coordination, and strategies to mitigate them. The culture of reflection enabled actors to monitor and document successes and challenges of multi-actor engagement. This insight highlights the importance of monitoring and documentation when calibrating management goals in collaborative environments (Cundill 2010). Furthermore the chapter highlights the importance of tracking network dynamics and system perceptions. Evidence from my study shows that the history of Machubeni landscape shaped the power dynamics within the transformative space, for example the functional incompatibility between traditional and democratic structures that led to conflict. This points to a need for future research to explore the issues of conflict and multi-actor cooperation in southern Africa (or post-colonial territories). The understanding of these issues could be a positive factor in mitigating the unintended outcomes of conflict and fractures. Therefore, acknowledging the role of history and context is important in landscape governance (Favretto et al. 2021a).

Apart from acknowledging the role of history in landscape governance Favretto et al. (2021a) highlights that: (a) building on what already exists, (b) finding a neutral convener, (c) displaying transparency and openness, and (d) building common and inclusive knowledge, is important for supporting collaboration and multi-actor engagement. Evidence from my study (refer to chapter 4) mirror these findings by Favretto et al. (2021a). Based on this study's findings and insights from literature (see Favretto et al. 2021a), the following three key recommendations can be offered. Since not all actors have the potential to influence decisions within the Masibambisane multi-actor forum, there is a need for creating a safe operational space for all actors (especially the youth). Finding a neutral convener might help to balance power dynamics within the multi-actor forum (see Cockburn et al. 2020, Kuster et al. 2020). Furthermore long-term multi-actor investment is required in order to fully realise the benefits of collaboration. Increased support for sustainable practices such as monitoring and evaluation is required. Lastly investing in long-term knowledge exchange will likely help in guiding future environmental models (Favretto et al. 2021b). While not advocating a blueprint model for successes, we argue that long-term knowledge exchange is important because it provides insights to policymakers and institutional designers working to improve or calibrate conservation, rehabilitation and restoration models.

6.2.4 Research question 4 (Chapter 5)

Chapter 5 analysed what role agency has played in the effectiveness of co-management initiatives in South Africa and Zimbabwe. As highlighted by chapter 2, agency is a little-studied element of environmental governance. Therefore, chapter 5 contributed to the discussions of governance and management in southern Africa by attempting to show how agency can be useful. The results from this study show that proposition III which argues that "governance fractures inhibit the development of individual and collective agency" is largely true. One important aspect emerging from the analysis is that capacity development is key in enabling the development of individual or group agency. For example, the Machubeni case study shows that natural resource user groups received 'appropriate' training as part of capacity development. This enabled natural resource user groups to have some sort of autonomy, a culture of innovation, anticipation and reflexivity, highlighting the importance

of these elements of responsive environmental governance for the development of individual and collective agency (Bennett and Satterfield 2018).

On the other hand, the state forests case study in Zimbabwe illustrates that little training, as well as a lack of genuine intent to share power, can inhibit individual and collective agency. For example, only government and senior project managers were mandated to make key decisions. Such illustrations of top-down decision-making processes are evident in co-management initiatives in Zambia (Nkhata and Breen 2010). Since some actors have been known to manipulate policy processes to suit their own agenda, it is important for policymakers, practitioners and academics to pay attention to the expressions of agency, while developing policy shifts that seek to build resilient governance structures.

The analysis of both case studies revealed that governance challenges or fractures, such as elitism, conflict between actors and lack of inclusion, have reduced support for the development of individual and collective agency, thereby inhibiting the capacity of governance systems to deliver their desired environmentally and socially sustainable outcomes. Through the lenses of Archer (1995), the results show that the structural and cultural configurations in both cases have reproduced. This indicates that the governance systems are constrained and natural resources are under pressure despite the careful institutional design and implementation of each case. Although governance systems have remained constrained due to schisms between key actors and their mandates, positive expressions of agency have emerged, including better connectivity and increased levels of participation by locals. Therefore, a structural arrangement is necessary for effective governance (Bennett and Satterfield 2018) but is not the only requirement, in southern Africa. It will also be worthwhile to investigate how we can include the critical aspects of agency in designing co-management initiatives in the region.

Based on the reflections from chapter 5, policymakers, practitioners, academics and other actors are advised to take account of the expressions of agency (positive and negative) in co-management initiatives. This is important because in nested governance systems, actors perform different functions and their functions shape multiple aspects of governance. In

addition, I propose the following recommendations for further research: Future research needs to analyse the role of agency and adaptiveness in natural resource systems because challenges related to participation were the most recurrent. At the same time, researchers need to analyse what kind of agency is required by different actors across scales. Here, I propose further analysis of agency using the lenses of multi-scales. I urge researchers to apply concepts of critical realism in analysing governance dynamics. Given the shift towards greater effectiveness in the region, concepts from critical realism may help to better identify and analyse governance. Concepts from critical realism are important because they can highlight the importance of history, structural mechanisms and transformative societal change (Archer 1995). Furthermore, concepts of critical realism might help in detecting the biases we have as researchers and of how we conceptualise governance dynamics.

6.3 Conclusion

This dissertation has elucidated the many complex dynamics that influence the capacity of natural resource governance systems in southern Africa. Exploring how governance challenges have manifested in natural resource management has provided evidence on where greater strategic governance reforms are required. Furthermore, the dissertation offers a nuanced perspective on the importance of history when analysing the evolution of governance dynamics. Results show that the current state of governance dynamics and rangeland condition in Machubeni can be linked to colonial history and past land policies. Again, this PhD has shown the importance of tracking the evolution of network dynamics in collaborative settings. Insights from this PhD show that widening participants' net enhances knowledge-sharing and coordination in landscape governance and management. Finally, this PhD has offered nuanced perspectives on the role of agency in determining the effectiveness of co-management. My study is one of the first studies that I am aware of that has attempted to explore, in natural resource user groups, the role of agency at the community level, in determining the effectiveness of co-management in southern Africa. Chapter 5 shows that in attempts to shift governance structures towards greater effectiveness, functional improvement alone is inadequate; agency itself must be directly addressed. Lastly, this thesis shows that there is a need for sustainable financing of

environmental projects. In conclusion, I hope this study has managed to ascertain and advance the research frontier of environmental governance in southern Africa.

6.4 References

Archer, M. S. 1995. *Realist Social Theory: The Morphogenetic Approach*. Cambridge University Press.

ATS/Ikwezi. 2004. Machubeni land use plan assessment report. *Rhodes University* (1):1–56.

Bennett, J. E. 2010. Constraints to the Management of Rangeland as a Common Property in Central Eastern Cape Province, South Africa. *Indiana* 1(1):25.

Bennett, J. E. 2013. Institutions and governance of communal rangelands in South Africa. *African Journal of Range & Forage Science* 30(1–2):77–83.

Bennett, N. J., and T. Satterfield. 2018. Environmental governance: A practical framework to guide design, evaluation, and analysis. *Conservation Letters* 11(6):e12600.

Berkes, F. 2009. Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of environmental management* 90(5):1692–1702.

Chaffin, B. C., A. S. Garmestani, L. H. Gunderson, M. H. Benson, D. G. Angeler, C. A. (Tony) Arnold, B. Cosens, R. K. Craig, J. B. Ruhl, and C. R. Allen. 2016. Transformative Environmental Governance. *Annual Review of Environment and Resources* 41(1):399–423.

Cockburn, J., E. Rosenberg, A. Copteros, S. F. (Ancia) Cornelius, N. Libala, L. Metcalfe, and B. van der Waal. 2020. A Relational Approach to Landscape Stewardship: Towards a New Perspective for Multi-Actor Collaboration. *Land* 9(7):224.

Cohen, P. J., L. S. Evans, and M. Mills. 2012. Social networks supporting governance of coastal ecosystems in Solomon Islands. *Conservation Letters* 5(5):376–386.

Cundill, G. 2010. Monitoring Social Learning Processes in Adaptive Comanagement: Three Case Studies from South Africa. *Ecology and Society* 15(3).

Falayi, M., J. Gambiza, and M. Schoon. 2020. Unpacking Changing Multi-Actor and Multi-Level Actor Ties in Transformative Spaces: Insights from a Degraded Landscape, Machubeni, South Africa. *Land* 9(7):227.

Falayi, M., C. Chakoma, and S. Myoyo. 2021. *Machubeni Communal Land-LandCare Report*. Pages 1–35. Landscape Plan, Rhodes University, Makhanda.

Favretto, N., S. Shackleton, S. M. Sallu, and T. Hoffman. 2021a. Editorial for Special Issue: "Collaboration and Multi-Stakeholder Engagement in Landscape Governance and Management in Africa: Lessons from Practice." *Land* 10(3):285.

Favretto, N., L. C. Stringer, A. J. Dougill, and L. Kruger. 2021b. Knowledge exchange enhances engagement in ecological restoration and rehabilitation initiatives. *Restoration Ecology* n/a(n/a):e13565.

Graaf, M. de, L. Buck, S. Shames, and R. Zagt. 2017. Assessing landscape governance: a participatory approach. *Assessing landscape governance: a participatory approach.*

Kusters, K., M. de Graaf, L. Buck, K. Galido, A. Maindo, H. Mendoza, T. H. Nghi, E. Purwanto, and R. Zagt. 2020. Inclusive Landscape Governance for Sustainable Development: Assessment Methodology and Lessons for Civil Society Organizations. *Land* 9(4):128.

Mutekwa, V. T., and J. Gambiza. 2017. Forest protected areas governance in Zimbabwe: Shift needed away from a long history of local community exclusion. *Journal of environmental management* 198:330–339.

Nelson, F. 2009. Conservation and Aid: Designing More Effective Investments in Natural Resource Governance Reform. *Conservation Biology* 23(5):1102–1108.

Newell, S., and J. Swan. 2000. Trust and inter-organizational networking. *Human Relations* 53(10):1287–1328.

Nkhata, B., and C. Breen. 2010. Performance of community-based natural resource governance for the Kafue Flats (Zambia). *Environmental Conservation* 37(3):296–302.

Palmer, A. R., and J. E. Bennett. 2013. Degradation of communal rangelands in South Africa: towards an improved understanding to inform policy. *African Journal of Range & Forage Science* 30(1–2):57–63.

Pereira, L., T. Karpouzoglou, N. Frantzeskaki, and P. Olsson. 2018. Designing transformative spaces for sustainability in social-ecological systems. *Ecology and Society* 23(4).

Potts, R. 2020. Disconnected dots?: A systematic review of governance challenges for natural resource management. *Journal of Environmental Planning and Management* 63(8):1356–1374.

Reed, M. S. 2008. Stakeholder participation for environmental management: A literature review. *Biological Conservation* 141(10):2417–2431.

Rocha, J., L. Luvuno, J. Rieb, E. Crockett, K. Malmborg, M. Schoon, and G. Peterson. 2020. Panarchy: Ripples of a boundary concept. *arXiv:2012.14312 [cs]*.

Sarmiento Barletti, J. P., A. M. Larson, C. Hewlett, and D. Delgado. 2020. Designing for engagement: A Realist Synthesis Review of how context affects the outcomes of multi-stakeholder forums on land use and/or land-use change. *World Development* 127:104753.

Stats SA. 2011. Statistics by place, Emalahleni Local Municipality. Pretoria.

Stringer, L. C., and A. J. Dougill. 2013. Channelling science into policy: Enabling best practices from research on land degradation and sustainable land management in dryland Africa. *Journal of Environmental Management* 114:328–335.

Appendices

Appendix 1: Ethical approval confirmation letter

RHODES UNIVERSITY
Where leaders learn

Human Ethics subcommittee
Rhodes University Ethical Standards Committee
PO Box 94, Grahamstown, 6140, South Africa
t: +27 (0) 46 603 8055
f: +27 (0) 46 603 8822
e: ethics-committee@ru.ac.za

www.ru.ac.za/research/research/ethics
NHREC Registration no. REC-241114-045

23 September 2019

Menelisi Falayi

Review Reference: 2019-0658-813

Email: g15f8833@campus.ru.ac.za

Dear Menelisi Falayi

Re: Assessing the dynamics of polycentric environmental governance

Principal Investigator: Prof James Gambiza

Collaborators: Mr Menelisi Falayi , Prof Michael Schoon

This letter confirms that the above research proposal has been reviewed and **APPROVED** by the Rhodes University Ethical Standards Committee (RUESC) – Human Ethics (HE) sub-committee.

Approval has been granted for 1 year. An annual progress report will be required in order to renew approval for an additional period. You will receive an email notifying when the annual report is due.

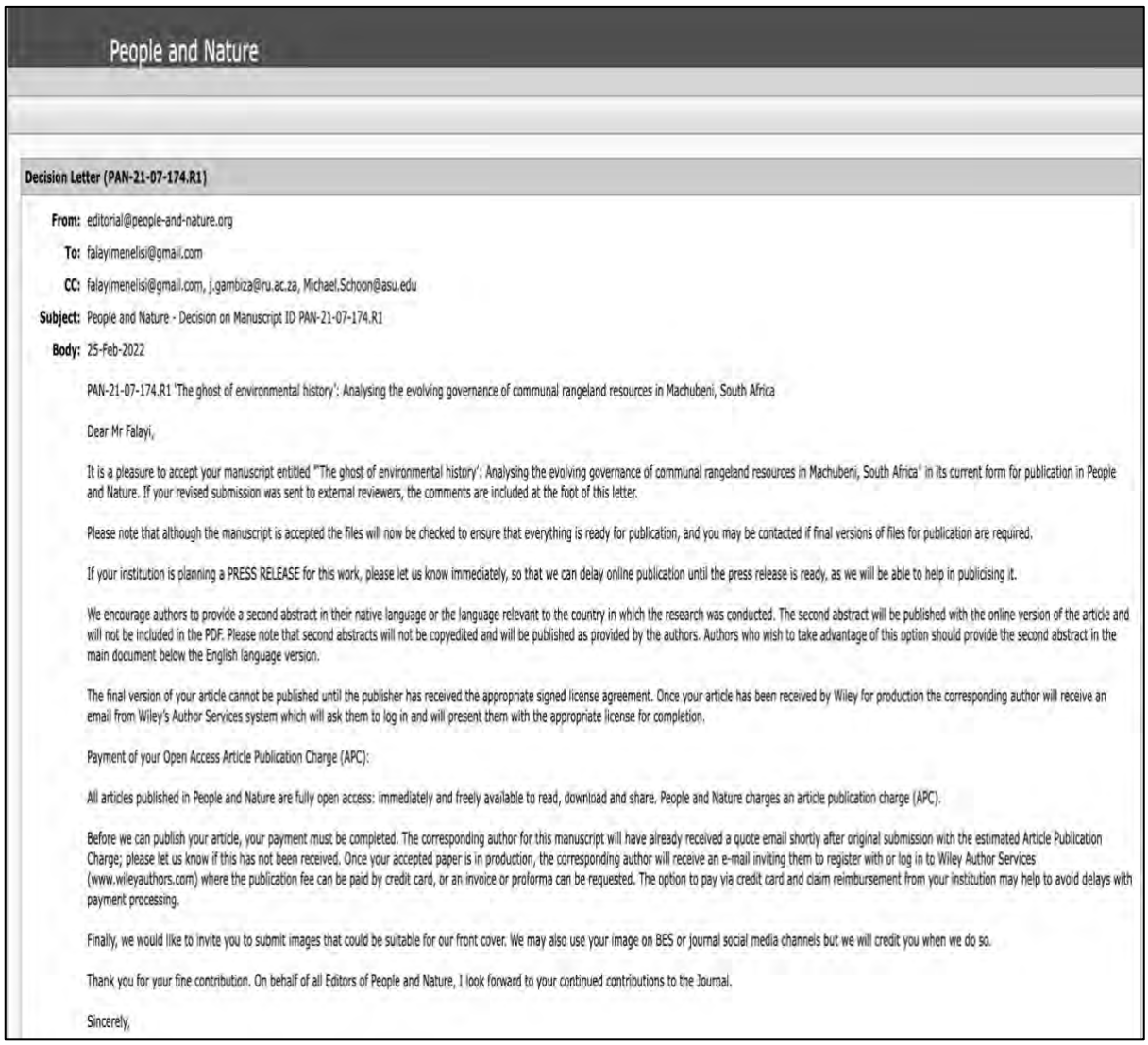
Please ensure that the ethical standards committee is notified should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Please also ensure that a brief report is submitted to the ethics committee on completion of the research. The purpose of this report is to indicate whether the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the ethical standards committee should be aware of. If a thesis or dissertation arising from this research is submitted to the library's electronic theses and dissertations (ETD) repository, please notify the committee of the date of submission and/or any reference or cataloging number allocated.

Sincerely

Prof Joanna Dames

Chair: Human Ethics sub-committee, RUESC- HE

Appendix 2: Confirmation of submission (*People and Nature*)



People and Nature

Decision Letter (PAN-21-07-174.R1)

From: editorial@people-and-nature.org

To: falayimenelisi@gmail.com

CC: falayimenelisi@gmail.com, j.gambiza@ru.ac.za, Michael.Schoon@asu.edu

Subject: People and Nature - Decision on Manuscript ID PAN-21-07-174.R1

Body: 25-Feb-2022

PAN-21-07-174.R1 'The ghost of environmental history': Analysing the evolving governance of communal rangeland resources in Machubeni, South Africa

Dear Mr Falayi,

It is a pleasure to accept your manuscript entitled "The ghost of environmental history': Analysing the evolving governance of communal rangeland resources in Machubeni, South Africa' in its current form for publication in People and Nature. If your revised submission was sent to external reviewers, the comments are included at the foot of this letter.

Please note that although the manuscript is accepted the files will now be checked to ensure that everything is ready for publication, and you may be contacted if final versions of files for publication are required.

If your institution is planning a PRESS RELEASE for this work, please let us know immediately, so that we can delay online publication until the press release is ready, as we will be able to help in publicising it.

We encourage authors to provide a second abstract in their native language or the language relevant to the country in which the research was conducted. The second abstract will be published with the online version of the article and will not be included in the PDF. Please note that second abstracts will not be copyedited and will be published as provided by the authors. Authors who wish to take advantage of this option should provide the second abstract in the main document below the English language version.

The final version of your article cannot be published until the publisher has received the appropriate signed license agreement. Once your article has been received by Wiley for production the corresponding author will receive an email from Wiley's Author Services system which will ask them to log in and will present them with the appropriate license for completion.

Payment of your Open Access Article Publication Charge (APC):

All articles published in People and Nature are fully open access: immediately and freely available to read, download and share. People and Nature charges an article publication charge (APC).

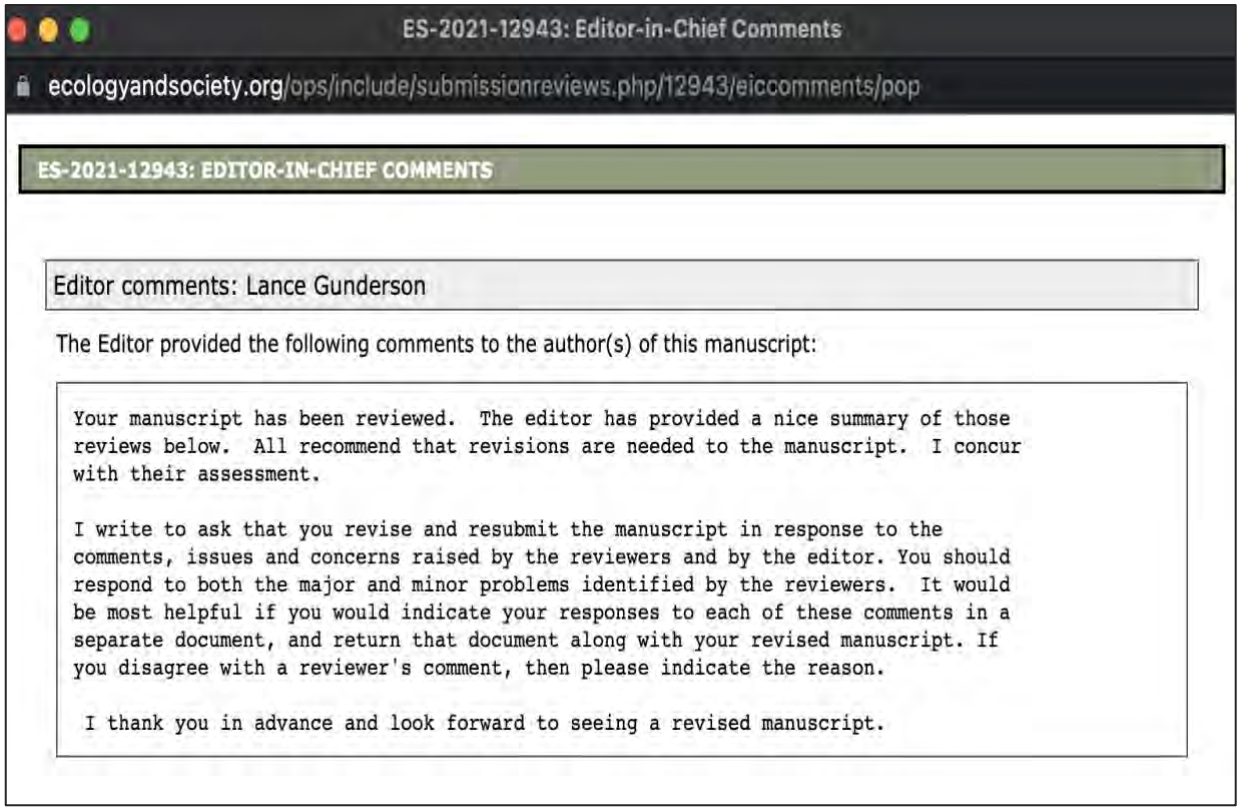
Before we can publish your article, your payment must be completed. The corresponding author for this manuscript will have already received a quote email shortly after original submission with the estimated Article Publication Charge; please let us know if this has not been received. Once your accepted paper is in production, the corresponding author will receive an e-mail inviting them to register with or log in to Wiley Author Services (www.wileyauthors.com) where the publication fee can be paid by credit card, or an invoice or proforma can be requested. The option to pay via credit card and claim reimbursement from your institution may help to avoid delays with payment processing.

Finally, we would like to invite you to submit images that could be suitable for our front cover. We may also use your image on BES or journal social media channels but we will credit you when we do so.

Thank you for your fine contribution. On behalf of all Editors of People and Nature, I look forward to your continued contributions to the Journal.

Sincerely,

Appendix 3: Confirmation of submission (Ecology and Society)



Appendix 4: Scoping review protocol

Table 1: Background of the scoping review

Title of the review	A scoping review of environmental governance challenges in Southern Africa from 2010 to 2020
Data extraction	August 2018
Data of write up	March 2021
Objective	How have governance challenges manifested in natural resource management between 2010 and 2020 in southern Africa?
Research questions	What is the broad characterisation of the studies selected? What are the dominant concepts identified? What are the challenges identified?
Eligibility criteria	The articles should focus on the governance of natural resources in southern Africa. Here southern Africa encompasses the sixteen countries that make up the SADC: Angola, Botswana, Comoros, Democratic Republic of the Congo (DRC), Eswatini (Swaziland), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe. Articles should refer to at least one challenge that is affecting the governance and management of natural resources. The articles included are in English.
Electronic database	Web of science Scopus EBSCOhost (Academic Search Premier)
Methods	**Database search** **Manual scanning**
Analysis	A database of bibliographic references, authors' names, article title, year of publication, country of focus, type of article and governance challenges were created in Microsoft Excel To explore the broad characterisation of the studies selected, the papers' content was manually analysed based on the date of publication, location of research, overall

	article approach (case study or literature review), the scale of analysis, and the natural resource sector. Descriptive analysis was carried out using Microsoft Excel. We used open coding to explore the dominant concepts or conceptual insights within the database. Analytical notes were written alongside each article to identify concepts/themes discussed (e.g. adaptive governance, polycentricity or stewardship). To identify governance challenges, textual data (results section) were manually coded based on the governance attributes described in Table 1. Manual coding involved identifying words, sentences or phrases relating to governance challenges. This process resulted in the emergence of analytical notes that identified the presence or absence of governance challenges. The coded data for each article was then categorised based on the four main objectives of environmental governance. Some of the articles mentioned or identified more than one challenge; this meant one paper could be sorted into two different categories. The categorises were iteratively revised to reflect the presence or absence of governance challenges.

Appendix 5: Identified challenges of environmental governance in southern Africa

Governance challenges		**No. of articles**	**% of articles**	% of governance challenges per objective
Effectiveness	Scope, goals and aims clear.	87	64.4	50.1
	Roles, functions and mandates of different actors are coordinated.	85	63.0	
	Capacity, skills and resources to implement.	106	78.5	
	Availability knowledge.	83	61.5	
	Accountability	102	75.6	
	Efficacy guides decision-making.	79	58.5	

Equitable	Views of marginalised actors are considered.	91	67.4	32.3
	Structures that ensure collective participation.	92	68.1	
	Fair distribution of resources	86	63.7	
	Laws and policies are present to ensure justice	80	59.3	
Responsive	Monitoring and evaluation capacity	7	5.2	2.0
	Anticipatory learning and planning	5	3.7	
	Spaces for adaptive reflection	6	4.4	
	Innovation and experimentation	1	1.5	
	Policy flexibility	1	1.5	
Robust	Institutional legitimacy	9	6.7	15.6
	Vertical and horizontal structural connections	90	63.0	
	Nested institutions	70	51.9	
	Polycentricity	5	3.7	

Appendix 6: Environmental governance: A practical framework to guide design, evaluation, and analysis

Table 1: Effective: Supports maintenance of system integrity and function

Attributes	Level of application				Level of confidence	Comments or notes on explanations, clarifications and examples
	1	2	3	4		
Effective: Supports maintenance of system integrity and function 0=Very poor; 1=Poor; 2=Satisfactory; 3=Good; 4=Very good						
1. Direction Are the governance goals and aims clearly articulated and communicated?						

2. Coordination How well do stakeholders coordinate across a landscape to identify synergies and opportunities for collaborative action?						
3. Capacity Is there capable and visionary leadership in the landscape? Mechanisms are present to resolve conflicts between groups?						
4. Informed Planning and management decisions and actions are informed by best available information?						
5. Accountable How well-functioning are mechanisms to ensure that public and private actors fulfil their duties and responsibilities towards relevant stakeholders in the landscape?						
6. Efficient Are there strong collaborative linkages between different research institutions?						

Table 2: Equitable: Employs inclusive processes and produces fair outcomes

Attributes	Level of application				Level of confidence	Comments or notes on explanations, clarifications and examples
	1	2	3	4		
0=Very poor; 1=Poor; 2=Satisfactory; 3=Good; 4=Very good						
1. Recognition Are views of marginalised and vulnerable groups considered?						
2. Participation How strong is the sense of community participation in the landscape?						
3. Fair Mechanisms that ensure socio-economic costs and benefits are just and fairly distributed?						
4. Just Laws and policies are present to protect local rights?						

Table 3: Responsive: Enables adaptation to diverse contexts and changing conditions

Attributes	Level of application				Level of confidence	Comments or notes on explanations, clarifications and examples
	1	2	3	4		
0=Very poor; 1=Poor; 2=Satisfactory; 3=Good; 4=Very good						
1. Learning Processes and platforms are in place to co-produce knowledge						

and enhance social and institutional memory?						
2. Anticipatory Long-term planning and foresight thinking are institutionalised?						
3. Adaptive Spaces for reflection and deliberation are institutionalised?						
4. Innovation Innovation and experimentation is encouraged and success and failures are monitored?						
5. Flexible Do policies exist that recognize the need to downscale environmental management and conservation models to fit local realities?						

Table 4: Robust: Ensure functioning institutions persist, maintain performance and cope with perturbations and crises

Attributes	Level of application				Level of confidence	Comments or notes on explanations, clarifications and examples
	1	2	3	4		
0=Very poor; 1=Poor; 2=Satisfactory; 3=Good; 4=Very good						
1. Legitimate						

Is institutional legitimacy conferred (e.g. in policy) and perceived?						
2. Connected Networks of organizations and actors are strongly linked vertically and horizontally?						
3. Nested Are tasks assigned to the appropriate levels?						
4. Polycentric Decision-making and action-taking centres are present at multiple places, across jurisdictions and at multiple scales?						

Appendix 7: Workshop and key informants' questions

- What are the key drivers influencing governance systems in Machubeni over time?
- What are some of the key changes that occurred in Machubeni?
- Which specific legislative policies influenced the governance of Machubeni over time?
- What are the key drivers influencing rangeland conditions?
- Which are the key policies that have influenced rangeland conditions?
- How have rangeland conditions changed over time?
- What are the current biggest challenges in landscape governance?

Appendix 8: Design principles, interpretations and application in the Machubeni Case Study

Design Phase (Pereira et al. 2019)	Application and interpretation of principles per stage
Problem definition Phase	Problem definition was done without imposition by the transformative space-makers. Different stakeholders noted that the culture of collaboration was ineffective and there was little knowledge-sharing and learning across actors, sectors and scales. The joint framing process resulted in the formulation of the

	transformative space called Masibambisane multi-stakeholder forum
Operationalization Phase	***Types of participants*** Stakeholders involved in the Sustainable Land Management (SLM) project were convened. ***Quality of participation*** Actors involved in the SLM project were identified and a social network analysis was employed to examine the multi-stakeholder ties.
Tactical Phase: Methods and Tools	A social network analysis and Q-methodology were used to map and examine the multi-stakeholder ties in the MMF.
Outcomes Phase: Measuring impacts of transformative change	The research shows evidence of new trust between RU, SLM hubs and DEDEAT.
Reflection Phase	Facilitated dialogue resulted in the creation of new commitment and strategies amongst stakeholders

Appendix 9: Natural resource governance experts interviewed

Governance experts	**Google Scholar or ResearchGate link**
Prof James Gambiza	https://www.researchgate.net/profile/James-Gambiza-2
Prof Michael Schoon	https://scholar.google.com/citations?user=IL-ksccAAAAJ&hl=en
Dr Georgina Cundill	https://scholar.google.co.za/citations?user=YIMUPQIAAAAJ&hl=en
Prof Anthony R. Palmer	https://scholar.google.co.za/citations?user=s6dyNn4AAAAJ&hl=en

Mr. Lawrence Sisitka	https://scholar.google.com/citations?user=zA93k3kAAAAJ&hl=en
Prof. Graeme S. Cumming	https://scholar.google.co.za/citations?user=5tR2YwsAAAAJ&hl=en
Prof David H.M. Cumming	https://www.researchgate.net/profile/David-Cumming
Prof Carolyn Gay Palmer	https://scholar.google.com/citations?user=RKoMHd8AAAAJ&hl=en