Environmental Conservation

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Thematic Section: Conservation Implications of Social-ecological Change in Africa South of the Equator

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

Menelisi Falayi[1], James Gambiza[1] and Michael Schoon[2]

[1]Department of Environmental Science, Rhodes University, Makhanda 6140, South Africa and [2]School of Sustainability, Arizona State University, Tempe, AZ 85287-5502, USA

Subject Review

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

Received: 6 June 2021
Revised: 19 September 2021
Accepted: 22 September 2021
First published online: 19 October 2021

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

Author for Correspondence:
Menelisi Falayi,
Email: falayimenelisi@gmail.com

Summary

Throughout southern Africa, there have been growing concerns about the rates of ecosystem degradation. This issue and natural resource governance concerns in general remain key challenges. 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'. The 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 that these attributes are considered less problematic for 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.

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 & 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 & 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 & 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 & Gambiza 2016). Several studies identify and examine governance challenges limiting the capacity of natural resource management systems at local or national scales in southern Africa (e.g., Orchard & 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 & 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.

Materials and methods

Selection of articles

Scoping reviews are used to comprehensively synthesize available knowledge on a topic (Arksey & 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 & 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 (Appendix S1, available online). We refined the framework of Bennett and Satterfield (2018) to structure, analyse and explore governance challenges (Table 1).

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 1). These objectives come from the rich history of environmental governance scholarship (see Graham et al. 2003, Lockwood 2010). The first objective – effective governance – refers to the importance of maintaining or improving both ecological and societal system integrity and functioning (Bennet & Satterfield 2018). The second objective – equitable environmental governance – underscores the importance of engaging with multiple decision-making processes to produce socioeconomic 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 & Satterfield 2018: 7). As is reflected in Table 1, this more comprehensive understanding enabled us to identify the dominant governance challenges in southern Africa.

Table 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 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 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.

https://doi.org/10.1017/S0376892921000333 Published online by Cambridge University Press

(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 (Appendix S2).

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 & 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. 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 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 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.

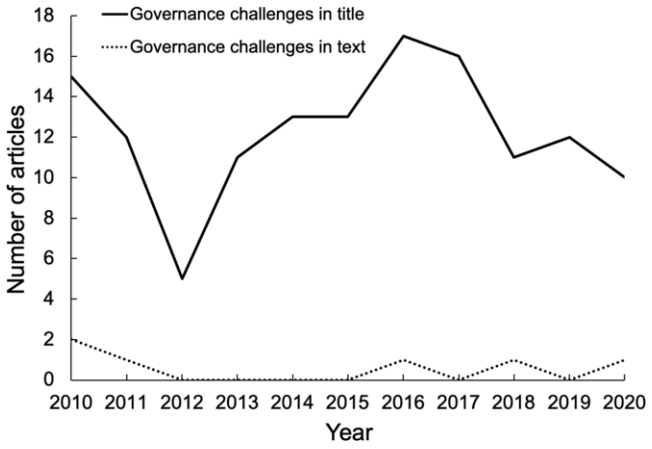

Fig. 1. Plot of the number of articles published annually during 2010–2020 in which 'environmental governance challenges' was referred to in the title only or somewhere in the text.

Limitations

We acknowledge some limitations to the scoping review method employed in this study. To address potential bias and limitations in rigour (Grant & 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.

Results

Broad characterization 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 (Fig. 1). Thus, in terms of academic outputs, an explicit research agenda on governance challenges has not surged since 2010 (Fig. 1). The review only identified 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 (Fig. 1).

Countries with at least ten articles that met the criteria for inclusion were Botswana, Madagascar, South Africa, Tanzania and Zambia (Table 2). South Africa accounted for 28.1% (n = 38) of

https://doi.org/10.1017/S0376892921000333 Published online by Cambridge University Press

Table 2. General description of the articles reviewed (n = 135).

Categorization	No. of articles	Percentage 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

Table 3. Governance challenges impeding the 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 the adaptability and flexibility of the institution	16	Cundill (2010), Knüppe and Meissner (2016), Falayi et al. (2020), Milupi et al. (2020)
Robust: challenges related to functional institutions	93	Komakech and van der Zaag (2013), Dyer et al. (2014), Thondhlana et al. (2015), Chinangwa et al. (2016), Makaya et al. (2020)

the articles, followed by Tanzania at 15.6% (n = 21) and Botswana at 11.9% (n = 16).

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).

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.

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 & 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.

Governance challenges in southern Africa

Table 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.

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 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.

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 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 & Breen 2010, Pollini & Lassoie 2011, Makaya et al. 2020). Of these challenges, lack of funding was the most recurrent theme inhibiting governance across scales (e.g., Chiluwe & Nkhata 2014). Several articles stressed that lack of funding inhibited multi-actor participation, thereby hindering successful governance (e.g., Orchard & Stringer 2016, Long et al. 2019).

https://doi.org/10.1017/S0376892921000333 Published online by Cambridge University Press

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 & 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 & Meissner 2016, Mutekwa & Gambiza 2016). Besides the lack of experts, there is little evidence of bottom-up and top-down knowledge sharing in most articles.

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 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 & Stringer 2016, Gwiriri & 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. 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 & 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 & 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 & Nelson 2011, Thondhlana et al. 2011, Bennett 2013).

Responsiveness: challenges related to the adaptability and flexibility of institutions

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 & 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

https://doi.org/10.1017/S0376892921000333 Published online by Cambridge University Press

was collaborative fatigue, since it impedes ongoing monitoring and evaluation in 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.

Robustness: challenges related to functional institutions

Challenges related to functional institutions, specifically low levels of connectivity, institutional legitimacy and weak polycentricity, were the third most reported among the 135 articles (Table 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 & 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 & 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 & 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 & 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 & 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 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 & Lassoie 2011). Lack of democratic processes was a barrier to selecting new committees in polycentric units (Orchard & Stringer 2016).

Discussion

This scoping review offers nuanced insights into governance challenges in southern Africa from 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 & 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 needed 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 & 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 to 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 & Breen 2010, Chinangwa et al. 2016). Failure to address the core challenge of power and benefit-sharing in southern Africa

https://doi.org/10.1017/S0376892921000333 Published online by Cambridge University Press

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 will 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 & 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 & 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.

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.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/S0376892921000333.

Acknowledgements. We would like to thank Prof G. Thondhlana (Rhodes University), Dr J. Cockburn (Rhodes University), Dr D. Gwapedza (IWR), Nonceba Bhebhe (Rhodes University), Chishimba Kasanga (Oxford University) and Miranda Bernard (Arizona State University) for giving crucial feedback on earlier versions of this manuscript. We also thank two reviewers who provided comments that assisted in greatly improving this manuscript.

Financial support. This research was made possible by the UNDP-GEF5 Sustainable Land Management Project (GEF PIB: 5327) through Rhodes University. Menelisi Falayi would like to acknowledge the Oppenheimer Memorial Trust (OMT REF: 21250/01) for additional financial assistance.

Conflict of interest. None.

Ethical standards. None.

References

Adams EA, Juran L, Ajibade I (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, Dziba L, Mulongoy KJ, Maoela MA, Walters M, Biggs RO et al. (2018) *The Regional Assessment Report on Biodiversity and Ecosystem Services for Africa: Summary for Policymakers*. Bonn, Germany: IPBES.

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

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

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

Bennett J, Ainslie A, Davis J (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 NJ, Satterfield T (2018) Environmental governance: a practical framework to guide design, evaluation, and analysis. *Conservation Letters* 11: 1–14.

Bicaba Z, Brixiová Z, Ncube M (2017) Can extreme poverty in sub-Saharan Africa be eliminated by 2030? *Journal of African Development* 19: 93–110.

Biesbroek R, Berrang-Ford L, Ford JD, Tanabe A, Austin SE, Lesnikowski A (2018) Data, concepts and methods for large-n comparative climate change adaptation policy research: a systematic literature review. *Wiley Interdisciplinary Reviews: Climate Change* 9: 1–15.

Bollig M, Menestrey Schwieger DA (2014) Fragmentation, cooperation and power: institutional dynamics in natural resource governance in north-western Namibia. *Human Ecology* 42: 167–181.

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

Carlisle K, Gruby RL (2019) Polycentric systems of governance: a theoretical model for the commons. *Policy Studies Journal* 47: 927–952.

Cassidy L, Wilk J, Kgathi H, Bendsen H, Ngwenya BN, Mosepele K (2011) Indigenous knowledge, livelihoods and government policy in the Okavango Delta, Botswana. In: *Rural Livelihoods, Risk and Political Economy of Access to Natural Resources in the Okavango Delta, Botswana*, ed. DL Kgathi (pp. 75–98). New York, NY, USA: Nova Science Publishers.

Chaffin BC, Garmestani AS, Gunderson LH, Benson MH, Angeler DG, Arnold CA et al. (2016) Transformative environmental governance. *Annual Review of Environment and Resources* 41: 399–423.

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

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

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

Cockburn J, Cundill G, Shackleton S, Rouget M, Zwinkels M, Cornelius SF et al. (2019) Collaborative stewardship in multifunctional landscapes: toward relational, pluralistic approaches. *Ecology and Society* 24: 1–15.

Cundill G (2010) Monitoring social learning processes in adaptive comanagement: three case studies from South Africa. *Ecology and Society* 15: 1–15.

Dyer J, Stringer LC, Dougill AJ, Leventon J, Nshimbi M, Chama F et al. (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, Koch E, Turner S, Magome H (2004) *Rights Resources and Rural Development: Community-based Natural Resource Management in Southern Africa*. London, UK: Routledge.

Falayi M, Gambiza J, Schoon ML (2020) Unpacking changing multi-actor and multi-level actor ties in transformative spaces: insights from a degraded landscape, Machubeni, South Africa. *Land* 9: 1–16.

Falayi M, Shackleton SE, Kemp GC, Shackleton CM (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: 90–107.

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

Gardner CJ, Cripps G, Day LP, Dewar K, Gough C, Peabody S et al. (2020) A decade and a half of learning from Madagascar's first locally managed marine area. *Conservation Science and Practice* 2: 1–14.

Graham J, Amos B, Plumptre TW (2003) *Governance Principles for Protected Areas in the 21st Century*. Ottawa, Canada: Institute on Governance, Governance Principles for Protected Areas.

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

Gwiriri LC, Bennett JE (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: 123–138.

Hegga S, Kunamwene I, Ziervogel G (2020) Local participation in decentralised water governance: insights from north-central Namibia. *Regional Environmental Change* 20: 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: 190–206.

Katikiro RE, Macusi ED, Ashoka-Deepananda KHM (2015) Challenges facing local communities in Tanzania in realising locally-managed marine areas. *Marine Policy* 51: 220–229.

Knüppe K, Meissner R (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 HC, van der Zaag P (2013) Polycentrism and pitfalls: the formation of water users forums in the Kikuletwa catchment, Tanzania. *Water International* 38: 231–249.

Kozanayi W, Wynberg R, Matose F (2014) Customary governance of baobab in eastern Zimbabwe: impacts of state-led interventions. In: *Governance for Justice and Environmental Sustainability*, eds M Sowman, R Wynberg (pp. 242–262). London, UK: Routledge.

Lockwood M (2010) Good governance for terrestrial protected areas: a framework, principles and performance outcomes. *Journal of Environmental Management* 91: 754–766.

Long S, Jones PJS, Randriana Z, Hadj-Hammou J (2017) Governance analysis of a community managed small-scale crab fishery in Madagascar: novel use of an empirical framework. *Marine Policy* 127: 102974.

Long S, Thurlow G, Jones PJS, Turner A, Randrianantenaina SM, Gammage T et al. (2019) Critical analysis of the governance of the Sainte Luce Locally Managed Marine Area (LMMA), southeast Madagascar. *Marine Policy* 127: 103691.

Makaya E, Rohse M, Day R, Vogel C, Mehta L, McEwen L et al. (2020) Water governance challenges in rural South Africa: exploring institutional coordination in drought management. *Water Policy* 22: 519–540.

Mandara CG, Niehof A, Horst HVD (2017) Women and rural water management: token representatives or paving the way to power? *Water Alternatives* 10: 116–133.

Mehta L, Alba R, Bolding A. Denby K, Derman B, Hove T et al. (2014) The politics of IWRM in southern Africa. *International Journal of Water Resources Development* 30: 528–542.

Milupi ID, Somers MJ, Ferguson W (2020) Inadequate community engagement hamstrings sustainable wildlife resource management in Zambia. *African Journal of Ecology* 58: 112–122.

Mogomotsi GEJ, Mogomotsi PK, Mosepele K (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: 391–408.

Moswete N, Lenao M, Stone MT (2019) Contextualising and conceptualising relationships in natural resources, tourism and community livelihoods. In: *Natural Resources, Tourism and Community Livelihoods in Southern Africa: Challenges of Sustainable Development*, eds MT Stone, M Lenao, N Moswete (pp. 1–5). London, UK: Routledge.

Mulale K, Chanda R, Perkins JS, Magole L, Sebego RJ, Atlhopheng JR et al. (2014) Formal institutions and their role in promoting sustainable land management in Boteti, Botswana. *Land Degradation and Development* 25: 80–91.

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

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

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

O'Higgins T, Farmer A, Daskalov G, Knudsen S, Mee L (2014) Achieving good environmental status in the Black Sea: scale mismatches in environmental management. *Ecology and Society* 19: 54.

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

Olsson P, Folke C, Berkes F (2004) Adaptive comanagement for building resilience in social-ecological systems. *Environmental Management* 34: 75–90.

Orchard SE, Stringer LC (2016) Challenges to polycentric governance of an international development project tackling land degradation in Swaziland. *Ambio* 45: 796–807.

Ostrom E (1994) *The Meaning of American Federalism*. San Francisco, CA, USA: Institute for Contemporary Studies Press.

Ostrom E (2009) *Understanding Institutional Diversity*. Princeton, NJ, USA: Princeton University Press.

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

Paavola J (2007) Institutions and environmental governance: a reconceptualisation. *Ecological Economics* 63: 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: 354–365.

Peters MDJ, Godfrey CM, Khalil H, McInerney P, Parker D, Soares CB (2015) Guidance for conducting systematic scoping reviews. *JBI Evidence Implementation* 13: 141–146.

Pollini J, Lassoie JP (2011) Trapping farmer communities within global environmental regimes: the case of the GELOSE legislation in Madagascar. *Society and Natural Resources* 24: 814–830.

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

Reed MS, Evely AC, Cundill G, Fazey I, Glass J, Laing A et al. (2010) What is social learning? *Ecology and Society* 15: 1–14.

Salmoral G, Schaap NCE, Walschebauer J, Alhajaj A (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, Shackleton C (2020) Fruits of the veld: ecological and socio-economic patterns of natural resource use across South Africa. *Human Ecology* 48: 665–677.

Scholes R, Montanarella L, Brainich A, Barger N, ten Brink B, Cantele M et al. (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*. Bonn, Germany: IPBES Secretariat.

Schoon ML (2013) Governance in transboundary conservation: how institutional structure and path dependence matter. *Conservation and Society* 11: 420–427.

Schoon ML, Robards MD, Meek CL, Galaz V (2015) Principle 7 – promote polycentric governance systems. In: *Principles for Building Resilience: Sustaining Ecosystem Services in Social-Ecological Systems*, eds R Biggs, M Schuter, M Schoon (pp. 226–250). Cambridge, UK: Cambridge University Press.

Shackleton S, Campbell B, Lotz-Sisitka H, Shackleton C (2008) Links between the local trade in natural products, livelihoods and poverty alleviation in a semi-arid region of South Africa. *World Development* 36: 505–526.

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

Steffen W, Broadgate W, Deutsch L, Gaffney, Ludwig O (2015) The trajectory of the Anthropocene: the Great Acceleration. *The Anthropocene Review* 2: 81–98.

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

Thondhlana G, Cundill G, Kepe T (2016) Co-management, land rights, and conflicts around South Africa's Silaka Nature Reserve. *Society & Natural Resources* 29: 403–417.

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

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

Tschakert P, Dietrich KA (2010) Anticipatory learning for climate change adaptation and resilience. *Ecology and Society* 5: 1–15.

Vincent K, Cundill G (2021) The evolution of empirical adaptation research in the global South from 2010 to 2020. *Climate and Development* doi: 10.1080/17565529.2021.1877104 (epub ahead of print).

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

Wiederkehr C, Berghöfer A, Otsuki K (2019) Ostrom's governance principles and sustainable financing of fish reserves. *Human Ecology* 47: 13–25.

Zuka SP (2016) Contesting institutional engineering for decentralized natural resource governance in Malawi. *SAGE Open* 6: 1–11.