GJ The Geographical Journal
Royal Geographical Society with IBG
Advancing geography and geographical learning

The Geographical Journal, Vol. **176**, No. 1, March 2010, pp. 25–38, doi: 10.1111/j.1475-4959.2009.00344.x

Cooperation at different scales: challenges for local and international water resource governance in South Africa

N MIRUMACHI* AND E VAN WYK†

**Department of Geography, King's College London, University of London, Strand, London WC2R 2LS*
E-mail: naho.mirumachi@kcl.ac.uk
†CSIR, Natural Resources and the Environment, PO Box 395, Pretoria, South Africa
E-mail: evwyk@csir.co.za

This paper was accepted for publication in September 2009

Theory on environmental governance and water governance emphasises decentralised, devolved forms of interaction between stakeholders. As previously excluded actors are empowered to take part in governance, new forms of cooperation are created. This paper examines how the cooperative principle has influenced stakeholder interaction at the local and international scales of water governance in South Africa. Water policies and initiatives have been set up to promote multi-level governance that emphasises cooperation between various stakeholders. The emphasis on cooperation and inclusiveness is particularly pertinent to the South African context because of its apartheid past. The paper asks whether there have been new forms of cooperation between a wider array of actors, as the theory proposes. By using the case studies of the Sabie catchment and the Lesotho Highlands Water Project to examine local and international level governance, the paper finds challenges related to power disparity and interdependence of actors, and risk perceptions of inclusive decision-making. It is found that at both the local and international level, the state, which is a 'traditional' actor, still plays an influential role in decision-making. 'New' actors such as businesses, civil society, and regional institutions are more visible but have limited decision-making power. Non-linear, time-consuming forms of cooperation occur in water governance.

KEY WORDS: water governance, cooperation, empowerment, South Africa

Introduction

Environmental governance has been heavily scrutinised in both concept and practice. While there are varying definitions, environmental governance can be characterised by the changing power relations of actors involved in managing and solving environmental problems. Governance indicates the inclusion of actors other than the state, such as civil society and the business sector (Bulkeley 2005; Lemos and Agrawal 2006; Büsher and Dressler 2007; Turton *et al.* 2007; Ali-Khan and Mulvihill 2008). Governance, in theory, opens up political space to a wider range of stakeholders. Decentralisation, a common theme in environmental governance, is precisely about changing power along the vertical scale of regional, national and local (Lemos and Agrawal 2006; Birkenholtz 2009). Lemos and Agrawal succinctly summarise the reasons why decentralisation has occurred in natural resource management:

> It can produce greater efficiencies because of competition among subnational units; it can bring decision making closer to those affected by governance, thereby promoting higher participation and accountability; and finally, it can help decision makers take advantage of more precise time- and place-specific knowledge about natural resources.
>
> Lemos and Agrawal (2006,303)

They also point out how governance brings about enhanced cooperation between a wider set of actors.

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

In this way, there are actors who become newly empowered in the inclusive process.

Water governance is also characterised by changing power relations. According to Norman and Bakker (2009), the water governance literature describes governance based not on political borders but on natural catchments, and encourages multi-sectoral approaches like Integrated Water Resource Management (IWRM). IWRM emphasises the role of local actors, and implies how local governments are 'in touch with community needs, more empowering, more effective in cooperative practices, and more cost-efficient than "higher" scales of governance' (Norman and Bakker 2009, 103). The governance of transboundary waters now cannot be described without the increased input from the global epistemic community and advocacy groups (Conca 2006). International river basin organisations and commissions have become common institutional forms that manage water. These organisations are set up with an aim of fostering basin-wide cooperation.

Hence, governance introduces new forms of cooperation among a range of actors. Institutional mechanisms, such as co-management, public–private partnerships and social–private partnerships are new – or 'hybrid' – ways in which the state, market and communities interact (Lemos and Agrawal 2006). However, there are questions raised as to whether governance is as effective as it claims to be. For example, governance has been described as being a 'mosaic' of concentration of authority (Büsher and Dressler 2007, citing Rosenau 2003). In particular, there are critiques regarding the supposed empowerment of actors. Batterbury and Fernando (2006) cautioned that the existence of civil society does not necessarily mean its increased influence. Regarding water governance, Norman and Bakker (2009) have questioned the assumption of how local level governance empowers actors in water management: they found that decision-making power had not increased significantly. Tools to empower local actors, such as community-based natural resource management, and participatory conservation and planning have been scrutinised for their effectiveness (e.g. Slater 2002; McCall and Minang 2005; Blaikie 2006).

The paper focuses on this cooperative aspect of governance and examines the challenges of stakeholder interaction in water governance. We use the case of South Africa, where water policy has been actively reformed and evaluated as 'progressive' (United Nations Development Programme 2006). South Africa has not only adopted the principles of water governance but has also embarked on the challenging task of implementation. Numerous local, national and trans-national legislative and policy frameworks in South Africa reflect renewed commitment to the governance of national and transboundary water resources. In particular, the cooperative principle of governance is highly emphasised (Colvin *et al*. 2008). As a country where access to natural resources was heavily asymmetrical based on the apartheid system of social segregation, this cooperative imperative has much significance. To overcome past segregation, the democratic, participatory approach has been judged to be a necessary element in the re-integration of inclusive civic-mindedness and the further development of the country (see Republic of South Africa 1996). However, decision-making over scarce water resources is a challenge for a state so diverse in its hydrology, and in its social and economic development. Mehta and Ntshona (2004, 10) argued 'the mere endorsement of the principle of social justice alone cannot suffice in determining how resources are to be distributed'. MacKay and Ashton (2004) importantly pointed out how various objectives of South African water policy are disoriented at the different scales of implementation.

The paper asks how the cooperative principle has influenced stakeholder interaction at the local and international scales of water governance in South Africa. Have there really been new forms of cooperation between a wider array of actors at different scales? As there is no 'single, correct, or best characterization of the scale challenge that applies to the system as a whole or for all actors' (Cash *et al*. 2006, 4), the paper examines how certain dimensions of interaction between 'traditional' and 'new' stakeholders manifest in a decentralised, devolved form of governance. These dimensions are power disparity, interdependence and risk; they can be seen as characteristics of empowerment. For the local case study, the paper uses the example of the Sabie catchment where business, conservation agency, irrigation group and a scientific organisation engaged in a dialogue for improved decision making. To illustrate how the cooperative principle is being interpreted in South Africa's engagement at the trans-national scale, we highlight an international water transfer scheme (Lesotho Highlands Water Project – LHWP) and the various regional initiatives that the scheme is under. This paper deliberately used an idiographic approach (Babbie 2004) by drawing on only one case per scale. This has the benefit of exploiting the authors' particular knowledge and experience bases and gaining insight from the detail of each case. The implication is that our interpretation may not be broadly applied to other cases, but rather the analysis provides a basis for drawing lessons and propositions about multi-scaled water governance from the detailed analysis of particular examples.

The rest of the paper is organised as follows. It first briefly examines how South Africa has reformed its water policy and the incentives behind it. This second section describes the characteristics of the policy and

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

legislative frameworks, namely the cooperative principle to guide water governance. The third section then introduces the case studies of the local and international levels to show how decentralised governance has been implemented, and how cooperative processes between various stakeholders have been encouraged. The dimensions of the cooperative process among the stakeholders are examined in detail in the fourth section: power disparity and interdependence of actors, and risk perceptions of inclusive decision-making. The fifth section analyses how power disparity, interdependence and risk impact the effectiveness of water governance at the two scales. The final section concludes with implications for the design of water governance.

Cooperation in water governance: the South African context

South Africa has reformed its water sector through both principle and implementation. The various frameworks proposed by the Department of Water Affairs and Forestry (DWAF) all place great emphasis on cooperative governance: the *Water Services Act* (1997b), *National Water Act* (1998a) and *National Environmental Management Act* (1998b). The *Water Services Act* and *National Water Act* are based on the Fundamental Principles and Objectives for a New Water Law for South Africa established by the DWAF in 1997. The Principles dictate the management of water 'in a manner that optimises the benefits for all parties in a spirit of mutual co-operation' (DWAF 1997a). These reforms have been underpinned by South Africa's commitment to principles of cooperative governance through its Constitution (Republic of South Africa 1996). South Africa has also taken part in regional initiatives such as the South African Development Community Revised Protocol on Shared Watercourses (SADC 2000) to manage its transboundary waters. This protocol aims at 'developing close cooperation for judicious, sustainable and co-ordinated utilisation of the resources of the shared watercourses in the SADC Region' (Preamble). In order to implement water management along the determined principles, the National Water Resource Strategy was published in 2004 (DWAF 2004). This document ensures the various governmental agencies involved in water issues act in a coordinated manner so that 'the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the policy and law' (DWAF 2004, i). While aware that 'policy, legislation and development planning do not always take the availability of water into account and that there is an assumption that water can always be made available for any development initiative', the strategy demands more cohesion between the national, provincial and local governments through mechanisms such as information sharing (DWAF 2004, 142). In addition, the strategy acknowledges the importance of its international obligations to treaties, conventions and protocols (DWAF 2004, 142). In this way, the strategy puts into action how decentralisation should be done along the vertical scale of international, national, provincial and local.

South Africa's active water sector reform has been brought about by two reasons. One is derived from its historical context. The previous apartheid regime structured access to natural resources based on race, resulting in a skewed resource allocation. Because water access was intertwined with the inequitable land tenure system, one of South Africa's challenges as a new democracy is to ensure equitable allocation. The second reason is concerned with the contemporary demands imposed by water scarcity. The water sector needs to meet the increasing demands of communities impacted by urbanisation and industrialisation (Ashton *et al.* 2006b). As water is considered to have characteristics of a public good in South Africa, allocation is considered best resolved via dynamic and ongoing deliberative processes rather than predominantly market relationships. The *National Water Act* (DWAF 1998a) clearly states that there is no private ownership of water. Instead, rights to the use of water must be applied for prior to being authorised and implemented.

South Africa shares four transboundary river basins with six neighbouring countries (DWAF 2004)[1]. The importance which South Africa places on the shared waters can be seen in its history of agreements over the management of waters with its neighbours (Ashton *et al.* 2006a). South Africa has entered agreements with its riparian neighbours and established bilateral and multilateral commissions. In addition, South Africa has been involved in region-wide and continent-wide initiatives. South Africa is party to the SADC Revised Protocol on Shared Watercourses. Other initiatives include the African Union and New Economic Partnership for African Development (see Elhance *et al.* 2005), UN-led African Water Vision, and the African Water Facility supported by the African Development Bank.

Water governance in South Africa includes 'new' actors, as opposed to traditional government. At the sub-national level, catchment management agencies, water user associations and catchment fora are being established to decentralise water resource decision-making (DWAF 2004). Donor agencies have become increasingly active in the management of transboundary waters in the SADC region. For example, the Danish International Development Agency is implementing the Regional Water Sector Programme (RWSP) and the German Technical Cooperation (GTZ) Transboundary Water Management in the SADC region.

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

It is important to understand the way in which water governance operates at various scales. Water governance in effect requires consideration of 'the *balance of power* and the balance of actions at *different levels of authority*' (Global Water Partnership 2003, 2). Redistributing the balance of power equitably between water users and synthesising authoritative water management challenges previous power asymmetries in water access and forms new power relations. South Africa provides an example of a society that is expected to transform fundamentally within a context characterised by moderate to low levels of certainty and agreement and in which cooperative and collaborative behaviours are essential (Kinnaman and Bleich 2004). In these various devolved, decentralised forms of stakeholder interaction, cooperation serves a variety of purposes from economic development, sustainable development, protection of aquatic ecosystems to conflict prevention.

Local level cooperation: cooperation as a means to improved decision-making

The Sabie catchment (6308 km^2) is located in the northeast escarpment portion of South Africa (Figure 1). The Sabie River is the least regulated river in this part of the country. It is also one of the healthiest rivers in the area, especially with regard to fish populations, despite the fact that increasing development upstream is having an impact on the water quality (Davies and Day 1998; Breen *et al.* 1994 1997). Hydrological variability (notably drought events) have led to both conflict (Weeks *et al.* 1996) and cooperation between water users in this catchment (van Wilgen *et al.* 2003). Cooperative relationships have historically been an attribute of subsets of the catchment community, but the catchment forum activities that sustained these behaviours in the past ironically became dissipated with the implementation of the *National Water Act* (DWAF 1998a). As the prospect of the establishment of new water management institutions became imminent, voluntary fora established prior to the water policy reform questioned the need for their usefulness under the new legislative framework (Sherwill *et al.* 2007).

With the involvement of a research organisation, three stakeholder groups with natural resource (and in particular water-related) interests were involved in an initiative to explore the requirements for cooperative decisions in water resource sharing in accordance with water policy. The research organisation played an influential role as catalysts, assisting stakeholders in structuring their issues, facilitating discussions and providing some resources for supporting the action-oriented initiative. The three groups constituted a private forest and sawmilling company at the high altitude end of the catchment; an irrigation group in the middle subtropical fruit-growing portion of the catchment; and the parastatal conservation agency responsible for the management of Kruger National Park, at the low altitude end of the catchment (van Wyk *et al.* 2006b). The three groups wished to build on the collective social capital developed in the catchment community in previous years, especially since a severe drought in 1992, which led to cooperative behaviours. The need for enhancing capacity for making water resource sharing decisions, which are based on fair and agreed upon trade-offs, formed

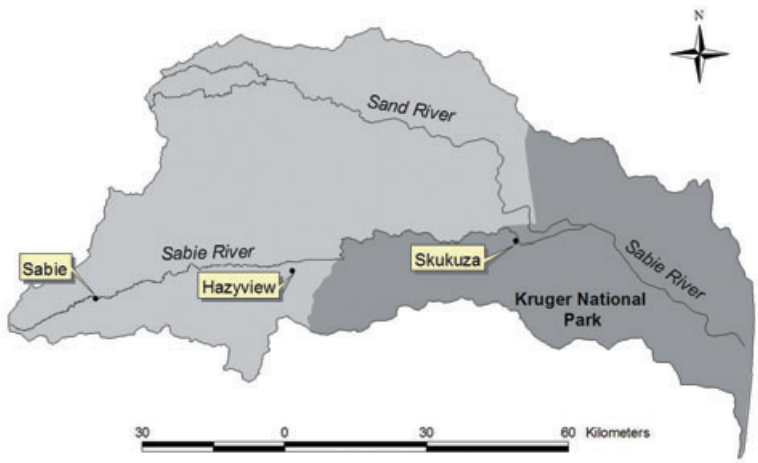

Figure 1 Map of Sabie catchment in South Africa
Source: CSIR

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

the basis for more recent engagement among this subset of water stakeholders in the Sabie catchment.

The Sabie case highlights the challenges faced by the three well-resourced interest groups in their efforts to promote an empowerment process for the collective benefit of a broader basin-stakeholder group with shared interests. The focus was on understanding the conditions that support cooperative behaviours, and the threats to sustaining such conditions. It was understood by the stakeholders that decisions made in isolation are likely to be weak; such decisions would be unable to withstand scrutiny and challenge over time. All three groups had individually experienced disappointments in past cooperative attempts. As a result, empowerment and capacity enhancement for more robust collective decisions became an important motivation (van Wyk *et al*. 2006b). For them, empowerment differentials between stakeholder groups emerged as a threat to cooperation potential. 'Empowerment differentials' were interpreted to be differentials in the sense of resources, knowledge, skills, confidence or capacity. This approach encourages the recognition of a potential 'mosaic' of empowerment differentials within and between groups and individuals. Another challenge experienced by the Sabie group was the difficulty in sustaining momentum in cooperative endeavours once they are set up (van Wyk *et al*. 2006b). In the Sabie case, cooperation was seen as an outcome of a participatory process that exposed shared problems.

International level cooperation: cooperation as a means to accelerate economic development

In the southern African region, there are many interbasin transfer schemes due to the spatial and temporal variability of water quantity (see Heyns 2002 for details). South Africa has long invested in both international and national interbasin transfer schemes to secure water. One of the operating bilateral transfer schemes is the LHWP with neighbouring country Lesotho in the Orange River basin (see Figure 2). This project has been transferring water from the Senqu tributary of the Orange River in Lesotho to South Africa since 1998 (see Figure 3). In 2008, Lesotho delivered 778.911 million cubic metres (MCM) (Lesotho Highlands Development Authority 2009). The water is transferred by gravity through a series of transfer and delivery tunnels. The water is used as potable water supply and for industrial activities in the economic heartland of South Africa, the Gauteng region.

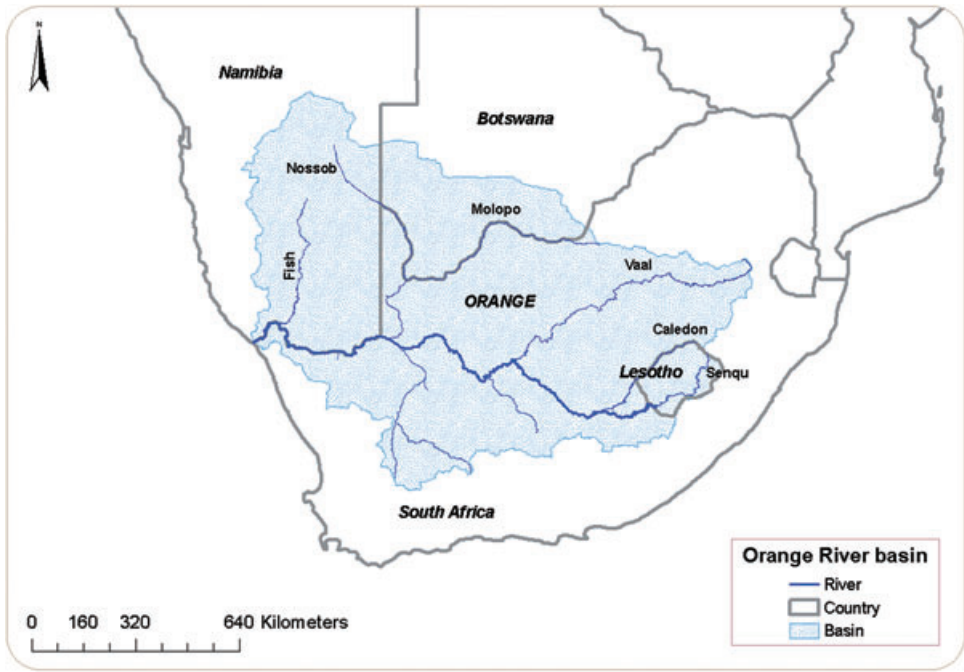

Figure 2 Map of the Orange River basin
Source: River tributaries and basin coverage adapted from GRDC (www.bafg.de/cln_015/nn_266934/GRDC/Home/homepage__node.html?__nnn=true) and DWAF data (www.dwaf.gov.za/iwqs/gis_data/river/rivs500k.html)

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

Figure 3 Map indicating phase 1 of the LHWP
Source: www.dwaf.gov.za/orange/images/rm261m6.gif

South Africa and Lesotho legally established their cooperation in the 'Treaty on the Lesotho Highlands Water Project between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho' signed in 1986[2]. The bilateral treaty has withstood changes of major political regimes in both South Africa and Lesotho. However, many controversies surround the project: speculation regarding South African manipulation of the Lesotho government to sign the project treaty (O'Meara 1996; Homer-Dixon 1999; Matlosa 2000; Furlong 2006); the adverse environmental and social impacts in the project area, which raise questions of how beneficial the project is to the Basotho locals (Horta 1995; Matlosa 2000; Hoover 2001; Thamae and Pottinger 2006; Mwangi 2007); South African led military intervention at a major project dam site (Pherudi 2003; Likoti 2007); and a corruption scandal between the project authority and multilateral corporations (Bracking 2001; Earle 2007).

Despite these issues, the treaty has been regarded as an example of successful regional cooperative initiatives over water, particularly among the implementing agencies (Mirumachi 2007). This has implications for the regional water management principles. With the creation of the Southern African Development Community (SADC) and their mandate for economic development, the water sector has been considered as the motor for achieving these goals. The SADC Revised Protocol on Shared Watercourses (2000) emphasises the need for collective effort in sustainable management of water for socio-economic development. The Orange Senqu River Basin Commission (ORASECOM), established in 2000, also acknowledges the cooperative initiative of the SADC protocol for better management between the riparian states. To this effect, the LHWP embodies the horizontal cooperation between riparian states. The protocol and the supporting SADC Regional Water Policy (2005), and ORASECOM also encourage the vertical linkage of water users for user-oriented, participatory management of the waters (Masedi 2007; Pyke 2007).

Three dimensions of the cooperative process in different scales of governance

The previous section introduced the case studies at the local and international level. It showed how decentralised governance has been implemented and how cooperative processes between various

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

stakeholders have been encouraged. Not surprisingly, there are differences between the way policy intended to engage stakeholders in the cooperative process and the reality on the ground. The politics of governance is naturally complex. Thus, in order to understand the challenges of inclusive and empowered relations, we highlight three dimensions in particular: power disparity, interdependence between the actors, and perceived risk of dynamic power relations.

Power disparity

The way to address existing power disparity and then to empower actors is especially challenging in South Africa, as participants try to overcome a historical culture of non-inclusive participation. This is particularly difficult at local levels where participants do not necessarily share professional or technical common ground, as may be the case at other levels of governance. More specifically, participants that may previously have been deprived of the opportunity to engage in negotiations of consensus building face the challenge of having to create and sustain new relationships in water governance (van Wyk *et al*. 2006b). Despite there being structural changes to how water is managed at the local scale through catchment management agencies and water user associations, redressing equity is complex and political (Schreiner and Van Koppen 2002).

In the Sabie River basin, consideration of power and power relationships was intentionally embodied in the process (and thus facilitated by the research organisation involved) to explore empowerment differentials as an important obstacle to resource-related decisions with supported and durable results. Hence, it was assumed that observed power disparities are a manifestation of differentials in empowerment. The assumption was that effective cooperative sharing of a common resource at the local level depends on some degree of common language, understanding, skills, confidence, and opportunities (Cook 1995) so that contributions to conversations and decisions can be collective and equitable.

As a result, despite there being no changes in the actual power dynamics between the three groups, the substance of the issue was influenced by new understanding. According to Mastenbroek (1980), the way in which issues are framed can be influenced through the negotiation of people with power disparity. It is perhaps because of the limited participatory size and the face-to-face contact that there was less emphasis on the actual hydrological availability but more on the process used to address allocation. The interaction between the three major stakeholders, a private forest and sawmilling company, an irrigation board and a parastatal conservation agency focused on understanding empowerment as a way to promote equitable trade-offs. In particular, empowering groups were understood to involve empathy, accountability, responsibility, transparency, inclusivity and tolerance, which would be achieved by communication, knowledge and committed attitude (van Wyk *et al*. 2006b). Ironically, in the Sabie study, the three well-resourced groups wished to enter into a process of cooperative empowerment with other stakeholders in the catchment, but chose to stall their process toward the end of the project due to lack of confidence that the regulatory body at the national scale (DWAF) would endorse their voluntary investment in the process (van Wyk *et al*. 2006b).

At the international level, power disparities can be highly influential in the outcome of water governance and specific water allocation agreements. Zeitoun and Warner (2006) exemplified how power asymmetry can lead to inequitable water allocation in transboundary waters. In the case of South Africa and Lesotho, South Africa's larger military, economic and political power leverage is significant in the bilateral relationship, not to mention within the region. The treaty was signed during the apartheid years and before South Africa's major water sector reform. However, the treaty includes certain aspects that encourage cooperative governance between differently endowed states. For example, the treaty mandates that the two countries work together through a bilateral organisation. The Joint Permanent Technical Commission was initially set up with equal representatives from both countries to monitor the project and activities of the countries' autonomous project bodies, Lesotho Highlands Development Authority (LHDA) in Lesotho and Trans Caledon Tunnel Authority (TCTA) in South Africa. Now the Lesotho Highlands Water Commission has replaced the original commission, though its mandate still remains to coordinate the project (Mirumachi 2007).

Increasingly, stakeholders other than the state have been involved in influencing project implementation. International and national advocacy groups have called to attention the adverse impacts of the project. The international NGO working on water issues, International Rivers (formerly International Rivers Network), has been at the forefront in addressing the pitfalls of large-scale infrastructure projects. The organisation has raised livelihood issues of locals in Lesotho who have been replaced during the dam construction process. The NGO produced a report that described how, despite having a substantial resettlement budget, the project failed to implement successful plans for restoring lives and livelihoods (Hoover 2001). The Environmental Defense Fund has also criticised the inadequate livelihood compensation and lack of commitment from the project authorities to improve conditions (Horta 1995). Earthlife Africa has campaigned against the project on grounds of

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

environmental and human rights violations (Meissner 2005). The Development Research Institute, an NGO based in South Africa, represented the voice of over 100 civic associations and protested against further development of the project in the 1990s (World Commission on Dams 2000; Emmett and Hagg 2001). In 1998, the Alexandra Civic Organisation directly raised their concerns of the project to DWAF's Minister, Kadar Asmal. It is said that the Minister pledged that future phases of the project would not be implemented (Meissner 2005). Similarly, Lesotho's NGOs have also been protesting against the project on environmental and social impact grounds (Archer 1996; Akindele and Senyane 2004; see also Meissner 2005). These criticisms have in part been taken into consideration by the project authorities. For example, the project authorities emphasise that the compensation plans for subsequent construction have been improved (Trans-Caledon Tunnel Authority and Lesotho Highlands Development Authority 2003). In addition, LHDA has officially responded to the International Rivers and Environmental Defence Fund's concerns (Meissner 2005). However, it is questionable how much influence these NGOs have on decision-making. While they have generated international attention towards the project and induced some reflexivity in the project authorities, their main protest against large-scale infrastructure has been thwarted with the two governments' decision to implement a second phase of the project (Hendricks 2008; see also www.lesotho.gov.ls/articles/2009/PHASE_II_LESOTHO_HIGHLANDS.php).

The LHWP is one of the projects that ORASECOM coordinates. ORASECOM brings together all four riparians, Lesotho, South Africa, Botswana and Namibia, for information exchange, basin project coordination, basin-wide planning, donor-funded project implementation and presence in river basin organisations (Pyke 2007). It seems that South Africa and Lesotho are branding the LHWP as a success within ORASECOM to rationalise the project politically. For example, Lesotho considers 'LHWP, an African success story; 22 years of water resources development and management' (LWHP website: www.lhwp.org.ls). The South African minister in the Department of Water Affairs and Forestry has publicly declared the project as a good example of cooperation over water in the SADC region (Hendricks 2007).

Although in its infancy, there have been generally positive assessments of ORASECOM as a functioning river basin regime (Jägerskog 2002; Heyns *et al.* 2008; Raadgever *et al.* 2008). Until the early 1990s, it was only South Africa and Lesotho that were actively involved in the development of the basin (Meissner 2005)[3]. Thus, Namibia and Botswana are, although state actors, 'new' in the governance of the basin. However, it is unclear how power disparity between the four riparian states is managed within ORASECOM. While South Africa and Lesotho have recently decided to proceed with further development of the LWHP, such decisions will be critically assessed by the downstream countries, in particular Namibia, for it may have negative impacts on downstream flow. In such cases, information sharing and dissemination will be crucial for basin-wide understanding of upstream development. So far, the integration of data and data dissemination are yet to be achieved (Raadgever *et al.* 2008). The SADC Hydrological Cycle Observing System (HYCOS) project aimed to 'develop and/or strengthen the national and regional capacity in the fields of water resource assessment, monitoring and management' (Rutashobya and Wellens-Mensah 2002, v). It has been assessed that, while the capacity of data management and potential information dissemination and exchange have been improved during the project operation years of 1998 and 2001, actual data exchange was under-achieved due to a combination of technical, institutional and managerial reasons (Rutashobya and Wellens-Mensah 2002). The issue of information sharing is particularly salient, as Heyns *et al.* (2008) argue in a discussion of the joint management of the Orange River basin that the differences in human and financial capacity will be an obstacle to participation as equal riparian states.

Interdependence

Due to the multiple and non-linear interconnectedness between river system components and the complex societal use system, it is very difficult to regulate resource supply and demand transactions effectively in a mechanistic way. This is because interdependencies are complex and not always explicit (van Wyk *et al.* 2006a). Even at the direct level of use, where resource use patterns are presumably most explicit, the connections between users and the resource are nonetheless complex and sometimes hidden (Rowntree 2003; van Wilgen *et al.* 2003). Furthermore, because resource and social systems are dynamic over space and time, reconciling the shifting costs and benefits from shifting interdependencies requires ongoing deliberation. As a result, at the local level, interdependence is not always recognised and needs to be taken into consideration in the decision-making process. In river resource sharing, a cooperative willingness may be in part driven by the acknowledgement and reinforcement of interdependencies made explicit in face-to-face dialogue. Face-to-face communication has been shown consistently to enhance cooperation when people are faced with a social dilemma (Ostrom and Walker 1989). This social learning process enables tolerance of interdependent uses of water: '[interdependence] does not mean a consensus or an

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

egalitarian treatment; it means an actionable set of activities where actors can be part of so that their specificity in terms of contribution and identity can find an acceptable level of fitting together' (Bouwen and Taillieu 2004, 147).

In the Sabie case, tools for exposing interdependence, such as face-to-face interaction, were used to enhance deliberation. In this regard, the research organisation facilitated the dialogue between the three major stakeholder groups (van Wyk *et al.* 2006b). However, the three major stakeholder groups were reliant on DWAF to legitimise their efforts to expand the interaction with other stakeholder groups. Considering that there was recognition that upstream and downstream users must interact for a holistic catchment-based management in this basin (van Wilgen *et al.* 2003), it can therefore be assumed that interdependence alone does not enhance the intensity of cooperation in the basin. In other words, as long as local-scale water management initiatives rely on the regulatory agency to endorse their efforts, the stakeholder groups will impose constraints upon themselves to be proactive in voluntarily making decisions and investing in actions that are compatible with their interdependent water interests.

In inter-state interactions, interdependence is not inherently 'good' or 'bad'. Previous empirical studies in international relations have shown that interdependence, in particular economic interdependence, brings about both conflict and cooperation (e.g. de Vries 1990). The LHWP has inevitably brought about a certain degree of interdependence between South Africa and Lesotho. The give-and-take arrangement of water and royalties between South Africa and Lesotho has created interdependence for regional growth, and is further enhanced by the institutional arrangement of the above-mentioned bilateral governance body (Mirumachi 2007).

The creation of ORASECOM has opened up space for discourse not only on environmental issues but also on economic and social issues of water development between the four countries. This allows for more opportunities of issue linkage to sustain regimes for transboundary water management and to challenge power disparity (Haas 1980; Daoudy 2005). Kranz *et al.* (2007) suggest that ORASECOM could help to limit the inadequate management of ecological impacts of the LHWP and future large-scale environmental issues.

In this regard, ORASECOM has placed emphasis on public participation to address water development issues. In a 'top-down' approach, the commission has made public participation one of its priorities on its agenda, creating a 'Roadmap towards stakeholder participation' in 2006 (Kranz 2008). The aim is to foster a stronger network of stakeholders at the transboundary level in an environment where national participatory approaches are 'rather small scale, fragmented, and . . . not yet reflected at the transboundary level' (Kranz 2008, 11). Donor agencies in the region have also encouraged public participation, thus facilitating more discourse on its implementation in ORASECOM. In theory, the interlinking of local, national and international stakeholders at the transboundary level will provide a basis for improved and integrated water management. However, reviewing the role of public participation in the Orange basin, Kranz (2008) analysed that ORASECOM will have to increase its ability and capacity to facilitate national and local level participatory processes. The implementation process of LHWP Phase 2 may well test such capacity of ORASECOM.

Risk

In the Sabie case, risk was interpreted in two ways. Stakeholders perceived a risk in not engaging in a cooperative manner of resource sharing. Additionally, they saw risks in the deliberation process. In terms of the former, resource users were willing to engage in a process that supports policy, which calls for more inclusive decision-making. There was generally good awareness regarding the intent of national legislation and the need for resource sharing as a vehicle for nation-building and overcoming past inequities in resource allocation. As a result, they perceived not supporting the intent of legislation as a risk of getting 'left behind' and losing an opportunity to be local-level leaders in supporting policy.

Furthermore, the three stakeholder groups perceived two major types of risks in the participation of a cooperative initiative. Both of these involve perceived low return on time and effort invested. Two of the stakeholder groups in the case study already had experiences of trying to engage other groups in a cooperative effort that had failed (van Wilgen *et al.* 2003). One group failed to generate commitment in a local municipality on a shared issue, while the other failed to invoke discussion with a national government department to assist in the interpretation of water policy. As a result, they were hesitant to engage in a new cooperative effort. In their experience, cooperative initiatives might start well but fail to generate and maintain momentum and commitment. For the Irrigation Board in particular, a great risk resided in engaging and promoting non-statutory, informal cooperative initiatives in the absence of support from other, statutory organisations (van Wyk *et al.* 2006b). The perceived risk would be to move forward with a process with great energy and investment only to discover later that it may not be aligned with the intent or pace of regulatory policy. For many resource users at the local level, it is empowering to design and

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

promote a bottom-up process. However, voluntary initiatives require investment of time and resources, and commitment.

In the Sabie case, concerns seen mainly from the perspectives of the researchers and practitioners involved were the risk of empowerment differentials and the impact of this differential on truly meaningful cooperation (Sherwill *et al.* 2007; van Wyk *et al.* 2006b). Large differences in participants' abilities to gain and assign legitimacy to the process of negotiating meaning (Wenger 2006) affect what a group deems important in water resource decision-making.

The Treaty of the LHWP reflects risks as perceived by the two states. Because the project involved large-scale infrastructure, the economic risk, deriving from South Africa or Lesotho failing to fulfil their responsibilities of royalties and water transfer respectively, are mitigated in the treaty clauses. For example, the Treaty makes explicit in particular how royalties should be paid if South Africa decides to cancel the project (Article 12.8). Article 14 lists cases of 'Force Majeure', such as sabotage of the project, and dictates that the two states must consult and act 'in a spirit of cooperation'.

Cooperation requires reallocation of governmental resources to accommodate policies and water management practices, risking domestic support. As such, the determinants of international cooperation over water have been argued as domestic (Waterbury 2002). As demand-side management is being practised in South Africa and water demand smaller than foreseen due to HIV/AIDS in areas like Johannesburg, the implementation of the second phase had been significantly delayed (Turton *et al.* 2006). The second future phase of LWHP to increase the volume of water transfer was considered in comparison to domestic water projects like the Thukela Water Project to supply to the Gauteng province. The feasibility study of the Thukela Water Project showed that it was technically and economically feasible (IWR Environmental 2000). Furthermore, local and international advocacy groups have fiercely protested against the LHWP. The government of South Africa did not show a consistent commitment to the second phase. From a government's perspective, a lengthy decision-making process can be seen as a risk. However, for the civil society and stakeholder networks, this is rather an opportunity to influence the quality of decisions, if not the actual decision.

Discussion

Water governance is concerned with the balance of power among different stakeholders with diverse interests. Power disparities exist at both the local and international scales of water management. This paper illustrates how the nature of power disparities can be characterised differently at different scales. In addition, the analysis shows that cooperation as emphasised in water governance may not necessarily address power disparity in a fundamental way. The various tools used to 'empower' the stakeholders – workshops for local-level stakeholders; treaty clauses and joint commissions at the international level – increase the potential for cooperation, but do not necessarily change how power is distributed. This paper has shown that there are certain stumbling blocks in the legitimisation of horizontal efforts to incorporate more voices (see also Manzungu, 2002). Changes in power were regarded as needing legitimisation from the central government. As a result, the scope of cooperation did not necessarily expand, even though there was an awareness of the interdependencies between the stakeholders. Thus, simply implementing 'participation' of local stakeholders does not directly bring about change in water management; 'participation' may not be a tool or technique of efficacy (Cleaver 1999). If rewards do not accompany the political process of empowerment, the process is stalled. This reflects how stakeholders perceive the risk of being involved in a political process of changing water practices. Water policy in South Africa sets a vision, but implementation of the vision is not concrete and involves reflexiveness (MacKay *et al.* 2003).

At the international level, the high principle of equity is repeatedly expressed in the bilateral and multilateral institutions involving South Africa and Lesotho. For example, ORASECOM has the potential to provide a better platform to address the underestimated or overlooked issues based on equity, without involving complex negotiations of treaty amendments, which may be politically costly for basin states to undertake individually. At the international level, because there is no central authority that will legitimise cooperation among sovereign states, the efforts to cooperate are much more prone to the good will of states. At the same time, it should be noted that the influence of civil society and NGO networks is not compatible to that of the state.

These three dimensions of power disparity, interdependence and risk refer to the social non-linearity of water governance. Empowerment is an evolutionary social process. At the local level, it is not atypical for there to be long periods of social capital formulation before cooperative agreements and actions emerge (see Innes and Booher 1999). In a similar local case in the Kat River basin in South Africa, where water management initiatives were based on principles such as inclusiveness and empowerment, empowerment attributes such as knowledge were initially felt to be insufficient to influence decisions by stakeholders (Motteux 2003). In other words, trust relationships have to be tested and reinforced through actions that are deemed legitimate or not. Implementing new

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

policy is time consuming (Wester *et al.* 2003), not to mention requiring essential policy coordination across sectors (MacKay and Ashton 2004). Fully implementing ORASECOM's public participation policy will require time not only from ORASECOM, but also from the numerous stakeholder groups who will have to enhance their resources to engage and contribute to the dialogue.

Conclusions

South Africa's water policies can be characterised as new, progressive and inclusive. The water policies and initiatives at the local, national and international scale fit under the umbrella of cooperative water governance. In theory, governance opens up new political space for actors other than the government. The decentralised, developed stakeholder interaction offers new forms of cooperation. However, to no great surprise, the reality on the ground differs from theory. The dimensions common to the local and international scales considered in this paper, namely power disparity, interdependence and risk, showed that there are nuanced differences in the way they operate in the different level contexts. The examined dimensions of the challenge of implementing water policies under cooperative principles are not exhaustive. However, these three aspects highlighted the political, non-linear and time-consuming nature of implementing the principles of water governance through policy. Although variables that explain the problem (in this case, the challenge of water policy) change according to the scale of analysis (Gibson *et al.* 2000), the following conclusion can be drawn from the examined cases. It can be said that at both the local and international scales, 'new' actors are more visible in the politics of water management. However, this does not mean that they have increased political power to influence decision-making. The approach used here is useful in that it exposes limitations in the way current water governance empowers stakeholders. The findings allow for the formulation of more specific hypotheses and interventions that aim to test key variables concerned with cooperation to close the gap between policy intention and reality at different scales of water governance.

Acknowledgements

The partial funding of the Sumitomo Foundation is acknowledged for providing an opportunity for collaborative work between the authors. The Water Research Commission, South Africa is gratefully thanked for their long-term research investment in the Sabie catchment and its people. The authors thank Leonardo Sáenz for his cartographic assistance with the map of the Orange River basin, Tony Allan and Daanish Mustafa for reading an earlier version, and two anonymous reviewers for their comments.

Notes

1 While the Department of Water Affairs and Forestry officially recognises that South Africa shares four river basins, some scholars identify six (see Kistin *et al.* 2009 citing Ashton and Turton 2008).
2 See Mirumachi (2007) for a discussion on the Basotho–South African cooperation before the signing of the treaty.
3 Namibia gained independence from South Africa in 1991.

References

Akindele F and Senyane R 2004 *The Irony of the 'White Gold'* Transformation Resource Centre, Maseru

Ali-Khan F and Mulvihill P R 2008 Exploring collaborative environmental governance: perspectives on bridging and actor agency *Geography Compass* 2 1974–94

Archer R 1996 *Trust in construction? The Lesotho Highlands Water Project* Report of Christian Aid and the Christian Council of Lesotho Christian Aid, London

Ashton P J and Turton A R 2008 Water and security in sub-Saharan Africa: emerging concepts and their implications for effective water resource management in the southern African region in **Brauch H G, Spring U O, Grin J, Mesjasz C, Krummenacher H, Kameri-Mbote P, Behera N C and Chouru B** eds *Facing global environmental change: environmental, human, energy, food, health and water security concepts* Springer, Berlin vol. IV 665–78

Ashton P J, Earle A, Malzbender D, Moloi M B H, Patrick M J and Turton A R 2006a *A compilation of all the international freshwater agreements entered into by South Africa with other states* Water Research Commission, Pretoria

Ashton P J, Turton A R and Roux D J 2006b Exploring the government, society, and science interfaces in integrated water resource management in South Africa *Journal of Contemporary Water Research & Education* 135 28–35

Babbie E R 2004 *The practice of social research* 10th edn Thomson/Wadsworth, Belmont, CA

Batterbury S P J and Fernando J L 2006 Rescaling governance and the impacts of political and environmental decentralization: an introduction *World Development* 34 1851–63

Birkenholtz T 2009 Groundwater governmentality: hegemony and technologies of resistance in Rajasthan's (India) groundwater governance *Geographical Journal* [online early]

Blaikie P 2006 Is small really beautiful? Community-based natural resource management in Malawi and Botswana *World Development* 34 1942–57

Bouwen R and Taillieu T 2004 Multi-party collaboration as social learning for interdependence: developing relational knowing for sustainable natural resource management *Journal of Community & Applied Social Psychology* 14 137–53

Bracking S 2001 The Lesotho highlands corruption trial: who has been airbrushed from the dock? *Review of African Political Economy* 28 302–6

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

Breen C, Quinn N and Deacon A 1994 *A description of the Kruger Park rivers research programme: phase II* Foundation for Research and Development, Pretoria

Breen C, Quinn N and Mander M 1997 *A description of the Kruger Park rivers research programme: phase III* Foundation for Research and Development, Pretoria

Bulkeley H 2005 Reconfiguring environmental governance: towards a politics of scales and networks *Political Geography* 24 875–902

Büsher B and Dressler W 2007 Linking neoprotectionism and environmental governance: on the rapidly increasing tensions between actors in the environment–development nexus *Conservation and Society* 5 586–611

Cash D W, Adger W, Berkes F, Garden P, Lebel L, Olsson P, Pritchard L and Young O 2006 Scale and cross-scale dynamics: governance and information in a multilevel world *Ecology and Society* 11 (www.ecologyandsociety.org/vol11/iss2/art8/) Accessed 16 July 2009

Cleaver F 1999 Paradoxes of participation: questioning participatory approaches to development *Journal of International Development* 11 597–612

Colvin J, Ballim F, Chimbuya S, Everard M, Goss J, Klarenberg G, Ndlovu S, Ncala D and Weston D 2008 Building capacity for co-operative governance as a basis for integrated water resource managing in the Inkomati and Mvoti catchments, South Africa *Water SA* 34 681–90

Conca K 2006 *Governing water: contentious transnational politics and global institution building* MIT, Cambridge, MA

Cook J 1995 Empowering people for sustainable development in **FitzGerald P, Mc Lennan A and Munslow B** eds *Managing sustainable development in South Africa* Oxford University Press, Cape Town and New York 279–96

Daoudy M 2005 *Le partage des eaux entre la Syrie, l'Irak et la Turquie: négociation, sécurité et asymétrie des pouvoirs* CNRS Editions, Paris

Davies B and Day J 1998 *Vanishing waters* University of Cape Town Press, Cape Town

de Vries M S 1990 Interdependence, cooperation and conflict: an empirical analysis *Journal of Peace Research* 27 429–44

DWAF 1997a *Fundamental principles and objectives for a new water law for South Africa* Department of Water Affairs and Forestry, Republic of South Africa, Pretoria

DWAF 1997b *Water Services Act* Department of Water Affairs and Forestry, Republic of South Africa, Pretoria

DWAF 1998a *National Water Act* Department of Water Affairs and Forestry, Republic of South Africa, Pretoria

DWAF 1998b *National Environmental Management Act* Department of Water Affairs and Forestry, Republic of South Africa, Pretoria

DWAF 2004 *National water resource strategy* DWAF Department of Water Affairs and Forestry, Republic of South, Pretoria

Earle A 2007 The role of governance in countering corruption: an African case study *Water Policy* 9 69–81

Elhance A, Drammeh H, Diop S, M'mayi P, Henson E, Schaefer M and Lindblom H 2005 Regional and subregional efforts to build hydropolitical resilience in Africa in **United Nations Environment Programme – Division of Early Warning and Assessment**, **Oregon State University – Transboundary Freshwater Dispute Database and University of Pretoria – African Water Issues Research Unit** eds *Hydropolitical vulnerability and resilience along international waters: Africa* United Nations Environment Programme, Nairobi 69–76

Emmett T and Hagg G 2001 The politics of water management: the case of the Orange River Development Project in **Khosa M M** ed *Empowerment through economic transformation* African Millennium, Durban 299–328

Furlong K 2006 Hidden theories, troubled waters: international relations, the territorial trap, and the Southern African Development Community's transboundary waters *Political Geography* 25 438–58

Gibson C C, Ostrom E and Ahn T K 2000 The concept of scale and the human dimensions of global change: a survey *Ecological Economics* 32 217–39

Global Water Partnership 2003 *Dialogue: effective water governance: learning from the dialogues* Global Water Partnership, Stockholm

Government of the Republic of South Africa and **Government of the Kingdom of Lesotho** 1986 Treaty on the Lesotho Highlands Water Project between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho

Haas E B 1980 Why collaborate? Issue-linkage and international regimes *World Politics* 32 357–405

Hendricks L B 2007 20 year GALA dinner of the Trans-Caledon Tunnel Authority, speech by Mrs L B Hendricks, Minister of Water Affairs and Forestry, The Hilton Hotel, Sandton, Gauteng, 19 April 2007 (www.dwaf.gov.za/Communications/MinisterSpeeches/2007/TCTA19April07.doc) Accessed 16 July 2009

Hendricks L B 2008 Media statement: Outcomes of Cabinet discussion on water and augmentation of the Vaal River System, 4 December 2008 (www.info.gov.za/speeches/2008/08120412151002.htm) Accessed 16 July 2009

Heyns P S V H 2002 Interbasin transfer of water between SADC countries: a development challenge for the future in **Turton A R and Henwood R** eds *Hydropolitics in the developing world: a Southern African perspective* African Water Issues Research Unit (AWIRU), University of Pretoria, Pretoria 157–76

Heyns P S V H, Patrick M J and Turton A R 2008 Transboundary water resource management in Southern Africa: meeting the challenge of joint planning and management in the Orange River basin *International Journal of Water Resources Development* 24 371–83

Homer-Dixon T F 1999 *Environment, scarcity, and violence* Princeton University Press, Princeton, NJ

Hoover R 2001 *Pipe dreams: the World Bank's failed efforts to restore lives and livelihoods of dam-affected people in Lesotho* International Rivers Network, Berkeley

Horta K 1995 The mountain kingdom's white oil: the Lesotho Highlands Water Project *Ecologist* 25 227–31

Innes J E and Booher D E 1999 Consensus building and complex adaptive systems *Journal of the American Planning Association* 65 412–23

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

IWR Environmental 2000 *Thukela water project feasibility study – instream flow requirement study: summary report (1995–2000)* Department of Water and Forestry, Pretoria

Jägerskog A 2002 Contributions of regime theory in understanding interstate water co-operation: lessons learned in the Jordan River basin in **Turton AR and Herwood R** eds *Hydropolitics in the developing world: a Southern African perspective* African Water Issues Research Unit (AWIRU), University of Pretoria, Pretoria 73–8

Kinnaman M L and Bleich M R 2004 Collaboration: aligning resources to create and sustain partnerships *Journal of Professional Nursing* 20 310–22

Kistin E J, Ashton P, Earle A, Malzbender D, Patrick M and Turton A 2009 An overview of the content and historical context of the international freshwater agreements that South Africa has entered into with neighbouring countries *International Environmental Agreements: Politics, Law and Economics* 9 1–21

Kranz N 2008 *Participation in transboundary water management: fostering adaptive capacity?* NeWater (www.newater.info) Accessed 16 July 2009

Kranz N, Vorwerk A and Vidaurre R 2007 Towards adaptive water governance: observations from two transboundary river basins International Conference on Adaptive and Integrated Water Management 12–15 November 2007, Basel, Switzerland

Lemos M C and Agrawal A 2006 Environmental governance *Annual Review of Environment and Resources* 31 297–325

Lesotho Highlands Development Authority 2009 *Water sales* LHDA (www.lhwp.org.ls/Reports/PDF/Water%20Sales.pdf) Accessed 16 July 2009

Likoti F J 2007 The 1998 military intervention in Lesotho: SADC peace mission or resource war *International Peacekeeping* 14 251–63

MacKay H M and Ashton P J 2004 Towards co-operative governance in the development and implementation of cross-sectoral policy: water policy as an example *Water SA* 30 1–8

MacKay H M, Rogers K H and Roux D J 2003 Implementing the South African water policy: holding the vision while exploring an uncharted mountain *Water SA* 29 353–8

Manzungu E 2002 More than a headcount: towards strategic stakeholder representation in catchment management in South Africa and Zimbabwe *Physics and Chemistry of the Earth, Parts A/B/C* 27 927–33

Masedi O A 2007 Transboundary water: cooperation workshop Transboundary water cooperation: national commitment, stakeholders and IWRM in the Mekong, the Nile and SADC/Zambezi: lessons learned and which way forward? 1–2 March 2007, Copenhagen, Danish Water Forum

Mastenbroek W F G 1980 Negotiating: a conceptual model *Group & Organization Management* 5 324–39

Matlosa K T 2000 The Lesotho Highlands Water Project: socio-economic impacts in **Tevera D and Moyo S** eds *Environmental security in Southern Africa* Southern Africa Regional Institute for Policy Studies, SAPES Trust, Harare

McCall M K and Minang P A 2005 Assessing participatory GIS for community-based natural resource management: claiming community forests in Cameroon *Geographical Journal* 171 340–56

Mehta L and Ntshona Z 2004 *Dancing to two tunes? Rights and market-based approaches in South Africa's water domain* Sustainable livelihoods in southern Africa Research Paper 17 Institute of Development Studies, Brighton

Meissner R 2005 The transnational role and involvement of interest groups in water politics: a comparative analysis of selected South African case studies Unpublished PhD thesis University of Pretoria

Mirumachi N 2007 The politics of water transfer between South Africa and Lesotho: bilateral cooperation in the Lesotho Highlands Water Project *Water International* 32 558–70

Motteux N 2003 *Guidelines for participation in integrated water resource management in South Africa. Participatory guidelines* Report No.1233/1/03 Water Research Commission, Pretoria

Mwangi O 2007 Hydropolitics, ecocide and human security in Lesotho: a case study of the Lesotho Highlands Water Project *Journal of Southern African Studies* 33 3–17

Norman E S and Bakker K 2009 Transgressing scales: water governance across the Canada–U.S. borderland *Annals of the Association of American Geographers* 99 99–117

O'Meara D 1996 *Forty lost years: the apartheid state and the politics of the National Party, 1948–1994* Ravan Press, Randburg, South Africa; Ohio University Press, Athens, OH

Ostrom E and Walker J M 1989 Communication in a commons: cooperation without external enforcement Paper presented at the American Political Science Association meetings 31 August–3 September 1989, Atlanta, GA

Pherudi M L 2003 Lesotho: political conflict, peace and reconciliation in the mountain kingdom in **Doxtader E and Villa-Vicencio C** eds *Through fire with water: the roots of division and the potential for reconciliation in Africa* 1st edn Africa World Press, Trenton, NJ

Pyke P 2007 One river – four nations Presentation to African Network for Basin Organizations (ANBO), 5 March 2007

Raadgever G T, Mostert E, Kranz N, Interwies E and Timmerman J G 2008 Assessing management regimes in transboundary river basins: do they support adaptive management? *Ecology and Society* 13 (www.ecologyandsociety.org/vol13/iss1/art14/) Accessed 16 July 2009

Republic of South Africa 1996 The constitution of the Republic of South Africa

Rosenau J N 2003 *Distant proximities: dynamics beyond globalisation* Princeton University Press, Princeton, NJ

Rowntree K 2003 *Guidelines for participation in integrated water resource management in South Africa. Environmental guidelines* Report No.1233/2/03 Water Research Commission, Pretoria

Rutashobya D G and Wellens-Mensah J 2002 *SADC-HYCOS (SADC Hydrological Cycle Observing System): evaluation mission report* European Union and South African Development Community (http://sadchycos.dwaf.gov.za/Key%20Documents/SADC-HYCOS%20Evaluation%20report%20by%20Datiuis%20and%20Juiluis.pdf) Accessed 16 July 2009

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society

Schreiner B and Van Koppen B 2002 Catchment management agencies for poverty eradication in South Africa *Physics and Chemistry of the Earth, Parts A/B/C* 27 969–76

Sherwill T, Arendse L, Rogers K, Sihlophe N, van Wilgen B, van Wyk E and Zeka S 2007 Stakeholder connectedness and participatory water resource management in South Africa *Water SA* 33 505–12

Slater R 2002 Between a rock and a hard place: contested livelihoods in Qwaqwa National Park, South Africa *The Geographical Journal* 168 116–29

Southern African Development Community 2005 Regional water policy (www.unep.org/dams/files/Country%20Dialogues/SADCRegionalWaterPolicy.pdf) Accessed 16 July 2009

SADC 2000 *Revised protocol on shared watercourses* South African Development Community

Thamae M L and Pottinger L eds 2006 *On the wrong side of development: lessons learned from the Lesotho Highlands Water Project* Transformation Resource Centre, Maseru

Trans-Caledon Tunnel Authority and Lesotho Highlands Development Authority 2003 *Sustainable development: Lesotho Highlands Water Project* TCTA-LHDA, Pretoria

Turton A R, Hattingh H J, Maree G A, Roux D J, Claassen M and Strydom W F eds 2007 *Governance as a trialogue: government–society–science in transition* Springer, Berlin

Turton A R, Schultz C, Buckle H, Kgomongoe M, Malungani T and Drackner M 2006 Gold, scorched earth and water: the hydropolitics of Johannesburg *Water Resources Development* 22 313–35

United Nations Development Programme 2006 *Human development report 2006: beyond scarcity: power, poverty and the global water crisis* Palgrave Macmillan, Basingstoke and New York

van Wilgen B W, Breen C M, Jaganyi J J, Rogers K H, Roux D J, Sherwill T, van Wyk E and Venter F 2003 *Principles and processes for supporting stakeholder participation in integrated river management* Report No. 1062/1/03 Water Research Commission, Pretoria

van Wyk E, Breen C, Roux D J, Rogers K H, Sherwill T and van Wilgen B W 2006a The ecological reserve: towards a common understanding for river management in South Africa *Water SA* 32 403–9

van Wyk E, van Wilgen B W, Arendse L I, Breen C M, Magadlela D, Rogers K H, Sherwill T, Sihlope N and Zeka S 2006b *The governance of shared natural resources: towards sustainable relationships for achieving equitable trade-offs* Report No. 1294/1/06 Water Research Commission, Pretoria

Waterbury J 2002 *The Nile basin: national determinants of collective action* Yale University Press, New Haven

Weeks D C, O'Keeffe J H, Fourie A and Davies B R 1996 *A pre-impoundment study of the Sabie–Sand River system, Mpumalanga with special reference to predicted impacts on the Kruger National Park. Volume 1. The ecological status of the Sabie–Sand river system* Report No. 294/1/96 Water Research Commission, Pretoria

Wenger E 2006 Learning for a small planet. A research agenda (www.ewenger.com/research/index.htm) Accessed 16 July 2009

Wester P, Merrey D J and de Lange M 2003 Boundaries of consent: stakeholder representation in river basin management in Mexico and South Africa *World Development* 31 797–812

World Commission on Dams 2000 *Orange River Development Project, South Africa, case study prepared as an input to the World Commission on Dams* World Commission on Dams, Cape Town (www.dams.org/) Accessed 16 July 2009

Zeitoun M and Warner J 2006 Hydro-hegemony: a framework for analysis of trans-boundary water conflicts *Water Policy* 8 435–60

From the archive

Lopez-Gunn E 2009 Governing shared groundwater: the controversy over private regulation *The Geographical Journal* 175 39–51

© 2009 The Author(s). Journal compilation © 2009 The Royal Geographical Society