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Reform and Regression: Discourses of Water Reallocation in Mpumalanga, South Africa

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ABSTRACT: This paper traces the implementation of reforms in water resource management in the Inkomati catchment, South Africa, since the National Water Act of 1998. It focuses on the ways that the predominant water users – white commercial farmers – have negotiated competing demands for water, particularly from black farmers and from growing urban water supply systems. The paper argues that existing commercial agricultural interests have largely succeeded in maintaining their access to water. We investigate this outcome using a cultural political economy perspective which focuses on an analysis of discourses of water allocation and explores how different discourses are reinforced by social practice and through their adoption by, and diffusion through, institutions of water governance. The research has identified three principle narratives that underpin discourse: scarcity, participation, and rights. It focuses on the ways in which calculative techniques for quantifying water use and economic value have been used to reinforce discourses rooted in narratives of water scarcity, and how these narratives ultimately structure water reallocation by agencies of water governance. The paper also identifies the wider political and economic dynamics at play, and the processes that may shift the current discourse of water reallocation.

KEYWORDS: Water reform, South Africa, cultural political economy, discourse, water re-allocation

INTRODUCTION: INEQUALITY AND REFORM OF WATER RIGHTS IN SOUTH AFRICA

Inequality and the water sector

The role of water rights reform in South Africa's post-apartheid political economy is both a marker for the degree of achievement of redress for past injustice and racial inequality, and a measure of the country's capacity to sustain the efficient and productive use of a vital natural resource. While the political discourse of post-apartheid reparations has tended to give more prominence to redistribution of land, the black population was excluded from property rights in water to at least the same extent as for land (van Koppen, 2008). Gini coefficients estimated for direct water use (Cullis and van Koppen, 2007) suggest that in rural areas disparities in access to water are much greater than those for income (Gini 0.95 and 0.65 respectively). In part, this is a consequence of apartheid settlement patterns that restricted the black population's residence rights to 'homelands' (comprising 13.5 percent of South Africa's geographic area) created as sites of 'self-rule' under tribal (now termed 'traditional') chiefs who were nominated and paid by the apartheid government. As with land, individual rights to use water within homelands were allocated by tribal authorities who themselves received their communal water allocation from the South African government. In practice, restrictions on investment in water infrastructure in homelands meant that such water allocations often went unused by African farmers

(Woodhouse, 1995, 2012). Since the end of apartheid, inequality in access to water continues to be felt, not only by black farmers but also by the large non-farming majority of the black population that lives in urban or peri-urban townships (Walker, 2005), and for whom domestic access to water for drinking and washing, and potentially for social and economic activity, is of greater immediate significance than access to agricultural land.

Yet the politics of water is clouded by a number of factors that both make reform of water access less likely, and obscure the reasons why this should be so. One important factor is the common urban-based perception of water for household and industrial use as delivered by a 'water sector' concerned with treatment and piping of water supplies and sewerage. This focus on water as a utility is reinforced in South Africa by its regulation under the Water Services Act, 1997, which is distinct from the legislation governing water resources in the wider hydrological landscape – the National Water Act, 1998. Ultimately, water services to households depend on allocations of water from the totality of water resources, of which, typically, water supply for domestic use accounts for less than ten percent. However, as we can attest from interviews, the urban-based majority of water users in South Africa is largely unaware of the linkage between their water services and water allocation decisions made at the catchment level.

In this paper we focus on the outcomes of the National Water Act ('the Act') in reallocating water in favour of groups historically disadvantaged under apartheid. Drawing on empirical work in the Inkomati catchment in the north-east of the country, we argue that decentralised water governance has not resulted in more equitable reallocation from commercial agriculture, and that much of the black population still has poor access to water. This conclusion has been reached in other studies (Kemerink-Seyoum et al., 2011; Brown, 2011, 2013; Woodhouse, 2012; Méndez et al., 2016) that have documented the many ways in which existing agricultural water users have legally subverted the implementation of reforms.

In this paper we seek to understand how this outcome has achieved a semblance of legitimacy, despite mounting evidence that the expectations of reform have not been met. We adopt a cultural political economy approach (Jessop, 2010), which enables us to explore meaning-making processes (semiotics) through which people interpret the complexity of lived experiences by replacing them with simpler explanatory narratives. Further, this approach elicits the ways that some discourses are competitively selected and retained as dominant explanations, which then come to define the range of possible expectations about society and nature. This process has been termed 'sedimentation' of discourse (Sum and Jessop, 2013). Finally, the approach examines the role of social practices and institutions in selecting and reinforcing some discourses at the expense of others, but also, in some instances, politicising discourses in the sense of challenging and destabilising settled ways of thinking. In this study, we identify different narratives – of scarcity, participation, and rights – that underlie discourses on water reallocation. We trace how the dominance of a discourse rooted in a narrative of water scarcity reflects its use and reinforcement by particular institutions and by social practices, such as the ways water use is measured and valued. While this dominant discourse perpetuates past water allocation priorities, we also identify other dynamics that have the potential to challenge it in future.

The paper draws on fieldwork undertaken on a number of occasions over the past 20 years in Mpumalanga province (Woodhouse, 1995; Woodhouse and Hassan, 1999; Brown, 2013; Woodhouse, 2012; Peters and Woodhouse, 2018). This work has involved analysis of documentary sources, as well as semi-structured interviews with a variety of water users in agriculture and industry, and with officials in municipal water services and government departments (notably the Department of Water Affairs and Forestry – DWAF, now the Department of Water and Sanitation). Officials from the catchment management agency established under the National Water Act were also interviewed. The most recent phase of this work, undertaken in 2015, included over thirty-five semi-structured interviews with catchment managers, irrigation board members, environmental scientists, National Park managers, municipal water managers, academic researchers from the Institute for Poverty, Land, and Agrarian

Studies at the University of the Western Cape, commercial farmers, and 'emerging' (i.e. black small- or medium-scale) farmers. Interviewees from government, academic, or non-governmental organisations (NGOs) were selected on the basis of their knowledge of the historic and current processes of water reallocation. Interviews with emerging and commercial farmers were arranged through snowball sampling via introductions by other interviewees.

Legislative reform and its implementation

South Africa's National Water Act of 1998 (Act No. 36 of 1998) was considered by many to be pioneering an international wave of reform in the water sector. The Act reflects a set of principles widely adopted as international best practices and incorporated into water reforms during the 1990s. These are frequently referred to as the 'Dublin Principles' from the 1992 International Conference on Water and the Environment (ICWE) in Dublin (Young et al., 1994; Heathcote, 2009). Though contested and debated within the water policy community, key ICWE principles included the idea that the river basin is a natural unit of analysis and management which requires a holistic management approach (Integrated Catchment Management); that action should be taken at the lowest appropriate level (subsidiarity), requiring decentralisation of management and representation of water users (with particular attention to women's role in ensuring water supplies in some societies); and that water has an economic value and therefore economic instruments should be used to encourage its efficient use. Though some aspects of the ICWE principles are reflected in the Act – suggesting the power of global discourse to shape South(ern) African water policy – the Act differed from the proposed international norm in stating as its explicit goals "promoting equitable access to water; and redressing the results of past racial and gender discrimination" (section 2 of the Act), as well as the more conventional commitments to meeting the needs of present and future generations, protecting ecosystems, and "promoting the efficient, sustainable and beneficial use of water in the public interest".

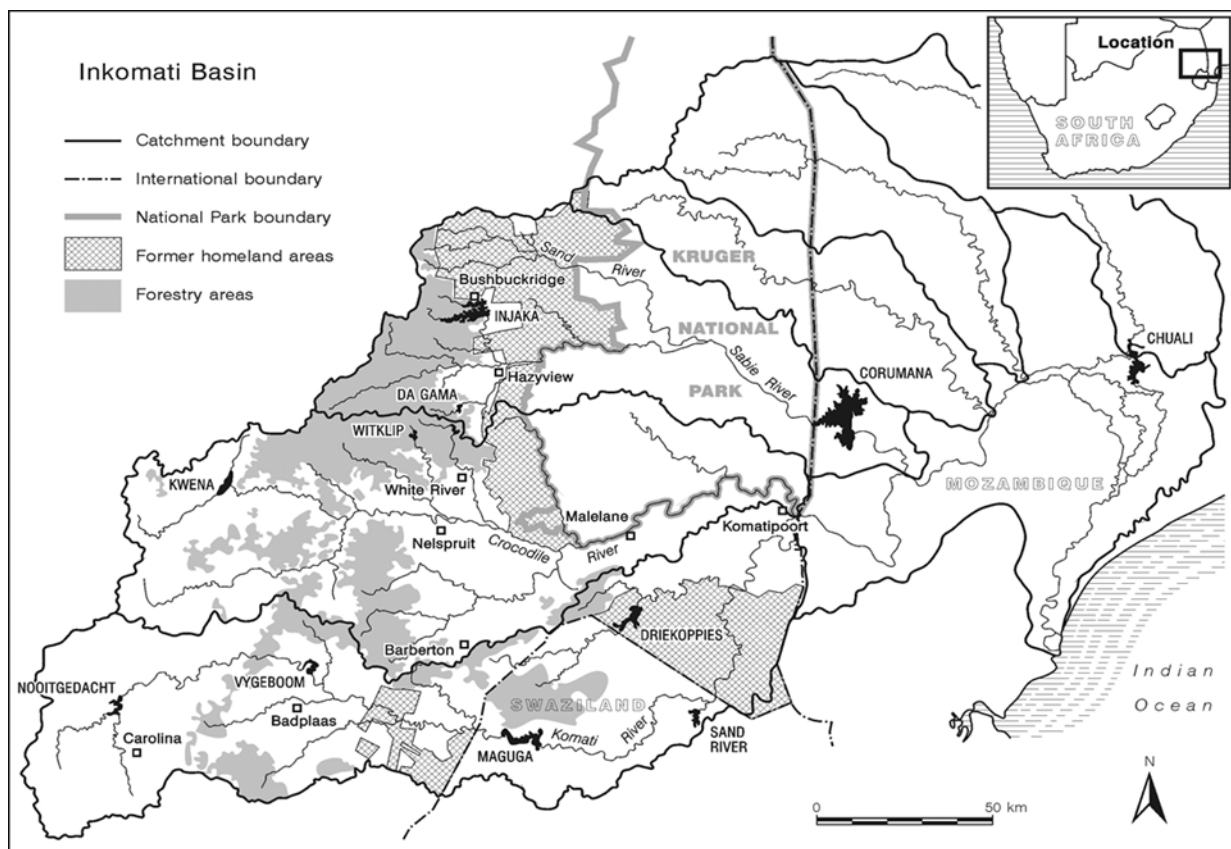
The goal of redressing past inequality means that South Africa's water reform was expected to deliver not only changes in process (holistic, decentralised, participatory, and economically costed), but also a change in social outcomes (redistribution of water allocation from white to black users). Inclusive Water User Associations (WUAs) at the local level would replace the exclusive irrigation boards which historically represented the interests of white-owned agriculture (Woodhouse, 1995; Kemerink-Seyoum et al., 2013; Méndez et al., 2016). Catchment management agencies at the larger catchment scale would serve to decentralise water governance by increasing channels for participation of water users in decision-making. The initial functions of catchment management agencies included: a legislative mandate to investigate and advise interested persons on the protection, use, development, conservation, management, and control of the water resources in its water management area; to develop a Catchment Management Strategy; and to promote coordination and community participation in terms of the National Water Act. The Inkomati Catchment Management Agency, established in 2004, was the first of 19 planned catchment management agencies. However the implementation of reform has been severely delayed. Moreover, the whole principle of delegation of functions to catchment management agencies by the DWAF was at one point called into question in the South African parliament (PMG, 2011). In 2012, the number of agencies was reduced from 19 to 9, and the water management areas were re-delineated (Meissner et al., 2016),¹ with the Inkomati Catchment Management Agency incorporating the Usuthu catchment and becoming the Inkomati-Usuthu Catchment Management Agency (IUCMA). The IUCMA Chief Financial Officer, in a July 2015 interview, stated that IUCMA was the only catchment management agency in the country considered to be fully operational. In the following section we outline the implementation of water reform in the Inkomati

¹ For current boundaries of catchment management areas, see www.cmra.org.za/sites/default/files/starter%20pack%20_final_full.pdf

catchment (formally known as the Inkomati Water Management Area), most of which lies in Mpumalanga province.

The Inkomati catchment drains eastwards from the Highveld (2000 MAMSL, 1500 mm rainfall per year) through the drier and hotter Lowveld (140 MAMSL, 400-1000 mm annual rainfall), and into Mozambique and the Indian Ocean (Figure 1). Rainfall is rather low for much of the catchment, and the primary source of water is surface water flowing in rivers, or stored in reservoirs. During the apartheid government, the black population was evicted from much of the area and resettled in a series of reserves, or ('homelands') established in the Lowveld, of which the most significant was administered by the KaNgwane 'tribal' administration (Mather, 1995). The areas from which people had been evicted were used for white-owned businesses: commercial forest plantations on the Highveld and escarpment, and irrigated agriculture (principally sugar cane, and tropical fruit such as citrus, banana, avocado, mango, and macadamia), on the Lowveld. A substantial part of the eastern Lowveld is also occupied by Kruger National Park (Woodhouse, 1995; James and Woodhouse, 2016).

Figure 1. Map of the Inkomati Basin, showing principle subcatchments.



Water resource infrastructure, including dams and canals, was well developed in the major part of the Inkomati WMA that was reserved for the white population. With the end of apartheid, and independent of the Act's water rights reform, major dams were constructed at Driekoppies (237 Mm³ capacity) and Maguga (303 Mm³ capacity) – justified as providing irrigation for black sugar cane producers. A dam built at Injaka (120 Mm³ capacity) was justified as an augmentation of domestic water supplies for the densely populated townships of the former homelands (Woodhouse and Hassan, 1999). Despite these investments, irrigated agriculture remains vulnerable, with severe droughts (in 1992/93, 2003-2005, and in 2015/16) and flooding (most recently in 2000). Official data (DWAf, 2005)

state that 57 percent of all water use in the WMA is for irrigated agriculture, 11 percent each for forestry, industrial use, and international treaty obligations to Mozambique, and the remainder (less than ten percent) is for domestic use (drinking and washing). As discussed below, estimates of water use are contested, but there is a consensus that the WMA is 'water-stressed', particularly in the Lowveld (DWAF, 2005).

Although the Inkomati Catchment Management Agency was the first to be established following the Act, the process of formal establishment took ten years (see Woodhouse, 2012; Brown, 2013). Initial proposals, in 2000, for local catchment management committees were rejected by the national DWAF as being insufficiently representative of the broad range of stakeholders. After further delays, in 2005 the DWAF created a governing board with nominated members, and work was started on transferring functions from the regional DWAF office to the catchment management agency. Protracted policy contestation (see Woodhouse, 2012) and leadership changes within the national DWAF further delayed progress until 2009, when the ICMA was directed to prepare the Catchment Management Strategy, subsequently approved by DWAF in 2010.

As we observed earlier, a number of studies have concluded that implementation of water reform in Inkomati and elsewhere has left the pre-existing dominance of water use by white farmers largely unchanged. They achieved this through exploiting their superior knowledge of water management, and their ability to use legal and financial services to their advantage (see, for example, Méndez et al., 2016 in Thukela catchment). In this paper we investigate how this position has come to be claimed as not just legally compliant with the Act but also legitimate in terms of water allocation. As stated above, our cultural political economy approach leads us to start by examining the diversity of discourses employed by different actors in framing the problems of water allocation and supply. A second line of inquiry considers the role of social practice in supporting particular discourses. We draw on interviews and policy documents from DWAF and the catchment management agency to identify the measures used to characterise and calibrate values in water (volume of supply, river flow levels, 'assurance of supply' or permitted seasonal variation, etc) and their role in reinforcing or undermining the legitimacy of particular discourses. A third line of analysis concerns the institutional assemblages through which competing discourses in water are projected and operationalised – or contested – among different organisations and users (collectively referred to as actors). We see this as a key element of structuration from a cultural political economy perspective.

Through these guiding questions, this research examines the institutions, actors, and systems of governance emerging in the Inkomati catchment after the 1998 water reforms. We investigate links between expression and realisation of different values for water and the implications for processes of reform. In the following sections we consider each of these elements in turn.

POST-REFORM DISCOURSES ON WATER ALLOCATION

One of the key architects of the National Water Act has stated that it was premised on "balancing the three legs of social benefit, economic efficiency and environmental sustainability", while setting "the legal framework for the national government to protect, use, develop, conserve, manage and control water resources" (Schreiner, 2013: 240-1). In essence, Schreiner identifies equity ('social benefit'), development ('economic efficiency'), and sustainability ('environmental sustainability'), as well as security ('legal framework') as distinct values of water.

To examine more closely the values underpinning water governance and management in the Inkomati catchment, we now consider three discourses – we have termed them scarcity, participation, and rights – that we have identified as the principal ways of making meaning in our cultural political economy approach to understanding water and decisions about its use.

Scarcity: Efficiency and pricing

The 'catchment' framework for water management brings an inherent sense of water as a bounded, and therefore finite, resource. This framework thus underpins an emphasis on water as a 'scarce' resource and on demand management and trade-offs between competing demands in water resource management. This may be contrasted to an approach that contemplates new investment, including 'inter-basin transfers', widely used in South Africa as a means to generate additional water supply to meet rising demand. One important consequence of conceptualising water as a scarce resource is that it enables the application of classical economic models of markets as mechanisms to achieve efficient allocation of water to more productive users via pricing and trading (Luks, 2010). The National Water Act does not propose the use of market allocations but provides for licensing of water use according to criteria of economic productivity, and allows for licences to be traded. The scarcity narrative is evident in the National Water Act generally, but in discussion of the Inkomati catchment in particular, due to its status as a 'water-stressed' catchment, defined in this case not in terms of water availability per person (as in UNDP, 2006), but in terms of the degree to which demand for water within the catchment exceeds available annual supply (cf. Water for Africa, 2006). In this respect, it is important to note, first, that water supply is not a fixed amount, since it is subject to adjustment according to the required assurance of supply (see below), the amount of water stored in dams, and allowances made for ecosystem conservation. Second, although water demand in the catchment is estimated to be around double the water availability, 83 percent of estimated demand is from irrigated agriculture (see DWAF, 2008: Tables 17 and 18). Thus, irrigated agriculture plays a fundamental role in discussions of water allocation in the IUCMA.

From the point of view of the redistributive potential of the National Water Act, two important elements of the IUCMA policy on water allocation flow directly from the discourse of water scarcity. In the first, two categories of users are identified. These are 'existing lawful users' and 'historically disadvantaged individuals' (HDIs) – these latter including the bulk of the non-white population that lives in homelands or in previously racially segregated townships in 'white' South Africa. An IUCMA legal advocate (interview, June 2015) stated that, at the time of the drafting of the National Water Act, the concept of existing lawful users was coined by a lawyer advising on the language of the Act, in order to soothe relations between the newly democratic state bureaucracy and furious white farmers threatening to take the DWAF to court. Movik (2014: 191) similarly reports a lawyer suggesting that the water allocation reform process "couldn't declare existing lawful use null and void, it would screw up the economy". Although the idea of economic disruption may seem a logical justification of existing lawful use, our 2015 interview with an IUCMA legal advocate indicated that maintenance of 'existing lawful users' was and remains controversial (see also Movik, 2014; Méndez et al., 2016). Notably, the term existing lawful user in the draft water allocation reform document (DWAF, 2004) follows three broad guidelines:

- Existing lawful uses will only be curtailed as a last resort, and only after all other options to find water for the poor and black economic empowerment² have been exhausted;
- Existing lawful uses of water will not be curtailed unless there are clear procedures and support programmes established to promote the productive use of water by 'emerging' (i.e black) farmers;
- No existing lawful consumptive user of water will be completely curtailed.

² Black economic empowerment (often denoted by the acronym BEE), is widely used in South Africa as a criterion for public policy initiatives.

Thus, the overarching principle of existing lawful use suggested that "it is critical to address equity needs, but attempts to deal with this must be balanced with the consideration that many existing lawful users are making productive, efficient and beneficial use and are contributing to socio-economic stability and growth" (Movik, 2014: 191; DWAF, 2004). Such language bears out concerns – expressed by some policymakers and scholars (Schreiner and van Koppen, 2002) throughout the reform process and confirmed in our 2015 interview with an IUCMA legal advocate – that defining particular users as 'lawful' would prevent meaningful redistribution.

A second element of the scarcity discourse in the water-stressed Inkomati catchment is the oft-repeated statement that "all of the water has been allocated".³ Associated with existing lawful use, this element translates into the inability of those seeking increased access to water (such as black households, their municipal water service authorities, or 'emerging' – black – farmers) to challenge lawful users whose water consumption is sanctioned by the state as "legal and thus legitimate" (interview with an IUCMA legal advocate, June 2015). Legality is thus a corollary to an interpretation of existing (white and corporate) users as economically productive. In practice, therefore, this discourse deflects detailed scrutiny of existing water use by commercial farming (and the potential for its reduction) on the grounds that it is both lawful and efficient. By contrast, HDIs are constructed as lacking discipline, and ill-equipped to manage scarce water resources without waste (Movik, 2014). Circulating policy papers regarding water allocation reform suggested that "if [water] reallocations occur too quickly, the country will suffer economic and environmental damage as emerging users struggle to establish productive uses of the reallocated water" (DWAF, 2004; Movik, 2014: 192). This perception of waste is applied to 'emerging users' (black farmers seeking irrigation), but also to the large number of black urban residents – either in peri-urban expansions of white towns such as Nelspruit and White River, or in the many large townships in ex-homeland areas – who are seeking improved water supply to their houses. For these HDIs, increased access to water cannot be found within the existing scarce resources because to do so would be wasteful of water already allocated to productive and lawful use, and thus requires creation of additional supply. An interview with a catchment management agency administrator revealed an underlying attitude: "if urban black areas want more water, they have to increase their own supply" (interview, June 2015).

Participation

As outlined earlier, the National Water Act followed ICWE principles in advocating a decentralised approach to water management, establishing agencies at catchment level with governing boards representing a broad range of local water users. The failure of this participatory approach to deliver water allocation reform in the Inkomati catchment has been analysed elsewhere (Woodhouse, 2012; Brown, 2013). Brown (2013) has argued that the large asymmetries in knowledge and experience between existing water users (notably the commercial farmers) and those seeking increased water access (black farmers and municipalities) constitute insurmountable barriers to reallocation of water through local participatory processes, which can only be expected to work if knowledge and power differentials between participants are less extreme. In this paper, we identify how the 'participatory' narrative of the Act was understood within the context of water reallocation in the Inkomati catchment. We discuss two distinct discourses. In the first, commercial farmers saw the Act not as decentralisation but, rather, as a threat to their existing local, private and collective control over water. Specifically, the Act extinguished what were effectively private property rights in water which previous (1956) legislation had protected in the form of riparian landowners' rights to use water in rivers and streams.

³ This is routinely stated in documents referring to the catchment (e.g. DWAF, 2008), but also by a number of our interviewees, including a legal advocate at the IUCMA (June 2015), an engineer at the IUCMA (June 2015), and a private engineering consultant with the IUCMA (July 2015).

Irrigation boards – originally set up by farmers to manage collective infrastructure such as dams and weirs, and to collect water fees – were required to become water user associations, with a broader mandate to manage water use by all water users on a particular stretch of river. In such a context, the narrative of decentralised, participatory water management was understood as central government interference in established local organisations. In particular, in converting to WUAs, existing irrigation boards would be required to apply for new water use licences, and would become responsible for collecting the water charges of 'outsiders', many of whom the irrigation board members perceived as having no intention to pay for water. Protracted and as-yet unresolved difficulties in establishing a framework of WUAs were thus to be expected. Similar dynamics have been observed in Thukela catchment by Méndez et al. (2016).

A second discourse of participation concerned the population of 'emergent' (black) water users in the ex-homeland areas. While these were formally merged with neighbouring 'white' magisterial districts of South Africa after the end of apartheid, the 'tribal' (now 'traditional') authorities designated under apartheid to govern land allocation and a variety of local administrative tasks – remain in place to this day. Among a number of important consequences that follow from this is that, strictly speaking, all property rights in ex-homeland areas are regarded as 'communal' and vested in tribal 'chiefs'. In practice, private property exists in these areas in the form of homes and businesses (including irrigated farms) built on land allocated by tribal authorities (and in principle subject to annual charges payable to the chiefs). Such investments by individuals are considered in effect to be the property of those who made them, and this translates into stronger individual rights of occupation of the land, in the sense that eviction would require compensation for investments made. Notwithstanding such developments, water allocations in ex-homeland areas were made on a collective basis (van Koppen and Jha, 2005). Thus, water allocations for irrigation by black farmers were divided notionally among tribal authorities and administered by the homeland (KaNgwane) Department of Agriculture, whose functions were taken over by the Mpumalanga Department of Agriculture (now the Department of Rural Development and Land Affairs – DRDLA). Irrigation supply was thus "dominated entirely by outside agencies, with neither any formal power for the local chiefs and councils nor any voice for the farmers themselves" (van Koppen and Jha, 2005: 205). The concept of individual water licences was therefore relatively unknown among homeland residents, and this has left many feeling disadvantaged when they venture into arenas dominated by 'existing lawful users'. One community leader interviewed by Brown (2013: 277) complained that he and others in his position were like "baby birds: we cannot stand up and face challenges".

Rights and citizenship

One of the most striking tensions in the South African discourse on water is the one between the 'catchment' perspective (associated with scarcity, and with allocation mediated by water users' participation), and the understanding of access to water as a right of citizenship (Bakker, 2007). A number of elements can be seen in this latter discourse, including the refusal to pay for water, and the sometimes ambiguous responses of government that both gloss over the legacies of inequality and continue to reinforce them.

The rights-based discourse emerging in rapidly urbanising former homelands and other deprived areas in the Inkomati catchment are primarily articulated through narratives regarding payment. The current debate within the water policy community regarding the origins of non-payment includes a range of explanations. One line of debate suggests that the 'culture of non-payment' stems from the anti-apartheid rent boycotts in the 1980s (von Schnitzler, 2008). Following the first democratic election in 1994, the ANC prioritised the resumption of payment for services, embedding this new imperative in the language of 'empowered' and 'active' citizenship, as exemplified by the White Paper on Water Supply and Sanitation Policy (DWA, 1994: 7):

An insistence that disadvantaged people should pay for improved water services may seem harsh but the evidence indicates that the worst possible approach is to regard poor people as not having resources. This leads to people being treated as the objects rather than as the subjects of development (...) A key element influencing a household's willingness to pay for an improved water supply is the households' sense of entitlement (...) and their attitude toward Government policy regarding water supply and sanitation. In general, communities are reluctant to involve themselves in countries where the perception prevails that it is the Government's responsibility to provide services.

In practice, in the face of mounting political opposition, the government agreed to provide a free basic amount of water (25 litres per day) to households (DWAF, 2002).

The implementation of 'general authorisations' in homeland areas envisaged under the Act somewhat contradicts this narrative of individual obligation to pay for water, and blurs the distinction between 'water services' for domestic consumption and water for small-scale productive purposes. These general authorisations are used as a means of legalising use of water by small-scale irrigators and livestock producers in ex-homelands where individual licenses are regarded as administratively expensive (van Koppen and Schreiner, 2014). This reinforces a contradiction between individual obligation to pay for water and collective rights to use water, and underlines the ambiguities in official positions with regard to the extent to which people in ex-homeland areas have the same status as citizens elsewhere who own property and pay for services.

FROM DISCOURSE TO STRUCTURATION THROUGH SOCIAL PRACTICE

The discourses reviewed in the previous section provide insights into the diverse ways that water users are represented by themselves and others. From this diversity, the 'scarcity' discourse has become selected and retained as the one that informs the policy and institutional structures of water governance. In this section we identify key elements of processes of legitimisation through which the narrative of water scarcity has tended to legitimise existing patterns of water allocation. In the following section we discuss the priority given to water-use efficiency as determined by the financial returns on water use achieved by large-scale farming, and to metrics of water use that emphasise the competence and flexibility of water management by corporate agriculture. We further show how these practices have been reinforced by strong asymmetries of information on water use in favour of large-scale farmers.

Corporate water users are deemed to be productive in part because of their significance in the local economy, by implication in creating employment, but also because they are visible and guaranteed to pay water charges to government agencies. Forestry is a major user of water, measured as streamflow reduction (rainfall interception in the upper catchment). The forest owners in the Inkomati catchment are mostly major corporations: South African Pulp and Paper Industries is one of the world's largest pulp and paper suppliers. Similarly, for the sugar industry: "The cane growing irrigation farming is another economic giant in the Inkomati catchment together with (the sugar cane processing company). They contribute greatly towards the economy in the water management area" (DWAF, 2008: 102).

Commercial agriculture also benefits from a discourse that emphasises flexibility of agricultural water demand, characterised as needing to be supplied with only 80 percent assurance (i.e. adequate water will be assured in four out of five seasons). In practice, allocations are decided on percentage of dam storage at the end of the rainy season (1 April). Where dams are below maximum storage capacity, then all farmers' allocations are liable to be reduced. Large-scale commercial farms have historically created substantial on-farm water storage and this, coupled with a focus on perennial plants such as sugar cane or orchard crops, means they are generally able to cope with all but major reductions in water supply. Smaller-scale less-capital-intensive producers who typically grow short-duration vegetable crops are more vulnerable to suffering complete crop loss. The superior flexibility of water use by commercial agriculture is a metric used in IUCMA discourse to claim it has lower impact than the

'high impact' of domestic/urban water users. This is on the grounds that households require high assurance: a guaranteed supply throughout the year, every year. The significance of this choice of metric was remarked upon during an interview with a former DWAF staffer who is now at the IUCMA (June 2015), who highlighted that this linking of impact with assurance of supply contrasts with the more conventional designation of Schedule 1 (domestic household) use as a low-impact category on the grounds of the relatively low volume of water required. The choice of 'assurance of supply' is thus a measure that accentuates the impact of water use by urban populations which, in the Inkomati catchment, account for only two percent of total water volume used, compared to 60 percent used by irrigated agriculture (DWAF, 2008). This 'high impact' narrative is coupled to claims of 'wasteful use' by (predominantly black) urban water consumers – both of which are framings that are enabled by an absence of accurate data. Water abstractions are supposed to be metered but some are not, and official figures rely on estimations from modelling. This has major repercussions on the discourse of water allocation, allowing often unsubstantiated claims such as "almost all municipalities use much more than their allocation" (interview with Catchment Management Agency engineer, June 2015).

The partial metering of water also highlights asymmetries in information about water use that favour existing water users. For example, irrigated agriculture is officially estimated to consume about 60 percent of total water in the catchment (formally designated the Inkomati-Usuthu Water Management Area), but actual volumes of water used by individual farmers are known only by the irrigation boards, who report to the IUCMA and DWAF only an aggregate figure for all their members. The justification given is that water allocations and associated charges are administered by the irrigation boards on behalf of individual farmers. Although this information asymmetry is inherited from the pre-Act period (Woodhouse and Hassan, 1999), little has changed despite widespread use of telemetry to monitor and record irrigation pump operation (Woodhouse, 2012: 858). As a consequence, efforts to verify individual farmers' use of water continue to rely on indirect measures which have effectively empowered farmers to contest efforts to reallocate water. This is exemplified by the licensing process originally conceived in 2004 as 'water allocation reform' to enable reallocation of water to historically disadvantaged (i.e. black) water users. In the absence of accurate records of water use by individual farmers, government officials resorted to satellite imagery, using estimates of irrigated crop areas to derive actual water use. The process became stalled amid contestations over irrigation efficiencies, changing farm boundaries, and transfers of farm ownership, until, in 2014, the water use that farmers had themselves registered as 'existing lawful use' was accepted as the amount for which they would be licensed, and billed (Woodhouse, 2012). Méndez et al. (2016) have since reported a similar outcome in Thukela catchment.

The dominance of the scarcity discourse is evident where 'new' demands on water use have successfully challenged irrigation interests. The National Water Act enshrined in legislation for the first time the use of water to maintain ecological conditions as a priority, known as 'the reserve'. In the Inkomati catchment reserving water for ecological purposes is strongly advocated by important tourist interests trading on their proximity to the Kruger National Park. These are downstream from most other water users in the catchment but represent significant white constituencies of tourists and business owners. The park itself has taken a leading role in mobilising technical studies and lobbying for the management of river flows for ecological maintenance, part of which is also used to satisfy international agreements stipulating minimum levels of cross-border flows downstream into Mozambique. 'Non-economic' use of water to maintain ecological flows does not require payment of water fees, and such allocations by the IUCMA have been subject to significant resistance from irrigated agriculture interests. While park officials seem satisfied with the outcome of the negotiation process, and South Africa National Parks does have significant leverage in the IUCMA, there is uncertainty about whether agreements will hold in time of drought. However, now that a precedent has been established, new demands are emerging for requirements to be determined for ecological flows on increasing stretches of river (van Koppen and Jha, 2005).

We may note at this point that, while not a focus of our study, international collaboration, notably with European Union countries, has potentially played a role in the evolution of IUCMA policy on water reallocation. In this regard we note the conservation orientation of contemporary water governance in Europe, with a presumption towards demand reduction, which is consistent with the 'scarcity' narrative identified in this study. However, a further aspect of water reallocation in the Inkomati catchment is that it has relied on fixed-term projects funded by bilateral aid rather than on core funding from DWAF (see Woodhouse, 2012), an example of which is DFID (UK) funding for analysis of satellite images used to verify irrigated crop areas. This can be plausibly attributed to the transitional nature of IUCMA funding during the first decade of the catchment management agency's existence, but has arguably weakened the credibility of government commitment to water reallocation.

Calculations of water quantity and quality are used every day in the water-value discourses within the IUCMA, for licensing, assessing existing lawful use, payment, infrastructure construction, and establishing the flow of water that must remain in a river. Calculations and calculability are therefore intimately related to those aspects of water and water use that are most valued. In this section we have highlighted how a narrative of water scarcity and its associated emphasis on efficiency of use has been reinforced by calculative techniques that support the continuation of existing patterns of water use by large-scale agriculture in the Inkomati catchment. We see this as a process through which the narrative leads to a structuration of possible outcomes. In the next section we explore the consequences of this structuration in relation to other discourses of water allocation and their interaction with other processes of change in the Inkomati catchment.

INSTITUTIONS AND THE RETENTION OF REGRESSIVE PATTERNS OF WATER ALLOCATION

South Africa's National Water Act of 1998 sought explicitly to redress past racial discrimination determining access to water. It established water as a national resource, locally managed within a national strategy to achieve access to water for the whole population. This aspiration, characterised by the DWAF slogan 'some, for all, forever', was to be achieved through decentralised, participatory water resource management institutions aligned with hydrological units: the catchment management agencies. A key part of the reforms was the belief that a new participatory catchment-based structure would enable competing demands to be satisfied in a transparent and accountable way. In practice, the new IUCMA has struggled to achieve meaningful dialogue among its disparate stakeholders and has tended to assume the values of scarcity management that ally it with existing 'productive' (and therefore lawful) capital-intensive and corporate water users particularly in irrigated agriculture.⁴ That this constitutes a wide institutional (and therefore political) alliance is illustrated by the way demands for water allocation to black farmers have been deflected by the success of land restitution claims under South Africa's land reform programme.

In 2008, ownership of some 60,000 hectares of commercial irrigated farmland in the Lowveld was transferred to black communities who had been expelled from the area in the 1950s. This transfer was interpreted by DWAF and the commercial sugar industry to have removed the need to reallocate water to black farmers, because the water allocated on the transferred farmland is now argued to serve the black population (interview with DWAF, June 2015). In practice, the sugar industry was able to lobby the Department of Rural Development and Land Affairs to ensure that the land and its associated water allocation continued to be used for sugar cane. The scarcity discourse, and the associated priority of water allocation according to economic-efficiency criteria, has played a key role in this outcome. Against a national land reform backdrop in which transferred farms had performed poorly – in large

⁴ This process is not specific to South Africa. See also Kemerink-Seyoum et al. (2017) for similar findings in Zimbabwe, and, for Tanzania, see Komakech and van der Zaag (2011), and Komakech et al. (2012a, 2012b).

part due to lack of technical and financial management support to new farm owners (Greenberg, 2010) – the sugar cane processing company was able to argue that productivity of irrigated land in the Mpumalanga Lowveld would be safeguarded if landowning communities entered into joint ventures with the sugar processing company's 'cane operating division'. This is a subsidiary which farms sugar cane directly, in contrast with the bulk of cane production which is purchased from independent – historically white, and now predominantly black – commercial outgrowers. The joint-venture model has enabled the sugar company to directly control production on a far larger irrigated area than before land reform, and has seen sugar cane area expand at the expense of more lucrative (but more difficult to market) tropical fruit crops. As a result, total sugar cane area in the Lowveld has expanded from about 34,500 ha in 1998 (Woodhouse and Hassan, 1999: 40) to 43,370 ha in 2013, with over a third now farmed directly by the sugar processing company (James and Woodhouse, 2016), representing an increasing concentration of control in the hands of a single corporate player. While landowning communities receive lease income for their land and preferential access to jobs on the farms, these have till now been limited (Woodhouse and James, 2015). Large-scale sugar cane farms generate relatively few jobs – albeit well-paid ones – and lease income distribution has become mired in contestation over governance by the Community Trusts that legally manage the land on behalf of the communities. More important still, the conservative strategy of handing control of land and water use to the main existing user of irrigation has blocked other routes for development of black-owned medium-scale agricultural enterprise. These have already shown themselves to have the capacity to diversify production away from dependence on sugar cane to crops with lower water use and potentially higher returns to labour (James and Woodhouse, 2016). Both of these are indicators that would challenge the water allocation logic that has been structured by prevailing narratives of water scarcity that associate efficient use with corporate agriculture.

The emancipatory logic of the National Water Act is in many respects consistent with the 'rights-based' narrative we identify among South Africans in townships and ex-homeland areas, which values access to water as one of the rights of citizenship that was achieved with the ending of apartheid and the gaining of the right to vote. As we have set out above, another dominant narrative inherent within the Act – that of 'water scarcity' – has dominated, imposing criteria of economic efficiency and, to a lesser degree, ecological and hydrological conservation as over-riding values in water-allocation decisions (van Koppen, 2008; Méndez et al., 2016; Kemerink-Seyoum et al., 2013).

For the assemblage of existing lawful users, government water agencies, and representative local catchment management, it is the historically disadvantaged water users who remain outsiders, cast in the role of needing additional supplies. The structural dimension is that additional infrastructure for storage and delivery of water for black farmers and black households must be paid for by them. What is not open for discussion is the basis on which much of the existing infrastructure was developed in apartheid South Africa, including past state subsidies of irrigation infrastructure in white areas. Today this is manifest in accumulated wealth and capacity for water management, contrasting with the lack of investment in black areas – now characterised by inefficient use and waste (Woodhouse, 1995). One of the consequences of ignoring the structuration by past patterns of state investment is that new infrastructure is not only deemed necessary to supply additional water, but that the burden of payment is to be met by 'historically disadvantaged' black communities (who cannot afford it) or the national government – but not by the local beneficiaries of existing lawful use to whom all water within the catchment has already been allocated (see also Kemerink-Seyoum et al., 2011 and Kemerink-Seyoum et al., 2017). This means that, in effect, the catchment management agency has denied responsibility for meeting the water needs of black communities within the catchment. As such, it seems to mark a divorce of the IUCMA as a 'sectoral' water entity supervised by the central government (DWAF), from a broader multi-sectoral 'problemshed' (Mollinga et al., 2007) development agenda, accountable to the electorate of the local (provincial) government. While acknowledging the many criticisms of the Mpumalanga provincial government, this is a structural element that enables a prioritising of 'sectoral'

discourses – such as water scarcity and conservation – over 'developmental' discourses concerned with raising living standards for those disadvantaged under apartheid.

The participatory discourse has been subordinated to that of water scarcity and maximising financial return. However, the third of the discourses we identified – in which access to water is considered a right of citizenship – suggests a different, more politicising, set of dynamics at work. By the end of apartheid, the ex-homeland areas of the Lowveld contained major high-density settlements, although these functioned largely as dormitories for people commuting to work on farms or in towns of previously 'white' South Africa. Since the end of apartheid, however, many of these officially rural settlements have seen the expansion not only of services such as electric power supply, but of commercial centres and shopping malls. These are sites of rapidly changing aspirations, but retain a structuration constituted by the persistence of traditional authority in ex-homeland areas and the tension between people's obligations as 'subjects' of their chief and their rights as citizens (cf. Mamdani, 1996; Levin and Mkhabela, 1997). Under apartheid definitions of what constituted 'traditional African communities', homelands were conceived as rural areas. This seems difficult to sustain in the contemporary Mpumalanga Lowveld. Consequently, areas under 'traditional authority' are now caught up in processes of social and economic change accompanying urbanisation that may ultimately transform political structures. Throughout the province, the line between 'rural' and 'urban' space is blurred as population concentration and growth have begun to overlay the apartheid patterns of settlement which constituted densely populated 'rural' (homeland) and low-density 'urban' (white areas). Many of these areas have since merged under unified local administrations (interview with NGO researcher, July 2015). However, assumptions regarding the functioning of democratic mechanisms are undercut by the persistence of elements of chiefly power in former homelands, particularly with regard to land and water. As we observed earlier, the absence of any mechanism or experience of individual water licences to allocate water to black farmers is the legacy of stratified water governance in former homelands (Woodhouse, 2012: 860).

The interviews we conducted in 2015 with officers of the municipalities of Mbombela and Nkomazi, with a 'smallholder' farmer in a former homeland, and with an NGO researcher, suggest that some areas formerly under traditional authority are now opting to become more fully integrated into a municipality, due to frustration with the lack of collaboration of traditional authorities with municipal government to improve services. By becoming a 'formal' part of the municipality, the hope is that better access to services may result. There are a number of implications following from the shifts of former homeland areas from rural to urban. Most prominently, newly urbanised areas are bringing in investment and business, which has altered the social and political economy of deprived areas, turning them into zones of consumption (interview with municipal authority, June 2015). The shifting urban expectations accompanying internal development contribute to new forms of contestation regarding the respective roles of the state and the municipality in providing water to marginalised communities, articulating a rights discourse in new and more practical ways. Yet, the capacity of municipalities to respond to such a gathering political pressure is hampered by the generally negative discourse within the IUCMA on 'inefficient' municipal water management. Here the divide between the demands of municipal leaders for more water on the one hand, and the capacity – or willingness – of the IUCMA to reallocate 'scarce' water on the other, is a major source of tension. The IUCMA view articulated in interviews with both an IUCMA administrator and a private consultant for the IUCMA (June 2015), is that this is mostly an issue of enforcement of the limits it has specified on how much water municipalities can use. The same source claimed that "government will not take government to court", and IUCMA is therefore resorting to "begging and negotiation" to "avoid rocking the boat", but this interviewee also suggested that while the catchment management agency is used to handling "political interference" from municipalities and irrigation boards, it may be time to "start heading to the courts... for municipalities to see how serious we are" (interview with IUCMA administrator, June 2015). It is not clear how these dynamics between water allocation and water demand will play out, and they will be

influenced by non-local forces, such as the willingness of central government to build more water storage in the catchment. They do suggest, nonetheless, that the existing structure of water allocation and the discourse that sustains it will come under increasing political pressure.

CONCLUSIONS

In the introductory section of this paper we identified cultural political economy as a way of organising our investigation of the role of discourse in, first making meaning out of complex realities, and then translating this explanation of the realities into a structuration of the expectations placed on society and nature. In applying this approach to understanding the dynamics and outcomes of the National Water Act in Mpumalanga province, we find that discourses rooted in catchment models privileging notions of water scarcity and demand management have tended to reinforce the prioritising of financial returns from water use, which has then been used to justify maintaining – and entrenching as water licences – the patterns of 'existing lawful use' established under apartheid. Further, the use of calculative techniques which claim that "all water has been allocated" (to the most efficient users) means that demands for increased access to water for historically disadvantaged black populations, whether in rural or urbanising areas, must be met from 'additional' investment rather than from any reallocation from existing users. We are aware that this finding may well apply elsewhere in South Africa (see also Méndez et al., 2016). Moreover, such new investment in infrastructure is identified as needing to be generated by the black populations themselves or from central government. The progressive redistributive goals of the National Water Act – to be achieved through decentralised participatory catchment-level water governance – therefore find little place in this 'hegemonic' narrative of water scarcity and maximising economic returns.

However, this paper also sheds light on the counter-discourse of access to water as a right of citizenship that was gained as a consequence of liberation from apartheid. While associated by many people with the apartheid-era refusal to pay for water, and with perceptions of the illegal and unruly aspects of South Africa's urbanising black society, we argue that this rights-based discourse of water contains expectations of improved water services that are articulated by the social practice of 'urban' living. Such expectations can be associated with transitions for many black people from rural 'homeland' governance by unelected traditional authority to 'modern' urban administrations with municipal councillors accountable to their electorate. We cannot foresee whether such a counter-discourse might come to significantly challenge the prevailing structure of water allocation, but it seems appropriate to recall Swyngedouw's (1999) assertion that it is not the intrinsic materiality of nature (in this case water) that determines how it is valued and managed, but the social relations of its use, and, moreover, that those relations are contingent on specific social and historic conditions. This at the very least implies the likelihood of change over time and, we suggest, fruitful further investigation of the evolving political relations between municipal authorities seeking increased water supply and the conservative discourse of 'water scarcity' maintained by the catchment management agency.

REFERENCES

- Bakker, K. 2007. The "commons" versus the "commodity": Alter-globalization, anti-privatization and the human right to water in the global south. *Antipode* 39(3): 430-455.
- Brown, J. 2011. Assuming too much? Participatory water resource governance in South Africa. *Geographical Journal* 177(2): 171-185.
- Brown, J. (2013) Can participation change the geography of water? Lessons from South Africa. *Annals of the Association of American Geographers* 103(2): 271-279.
- Cullis, J. and van Koppen, B. 2007. *Applying the Gini coefficient to measure inequality of water use in the Olifants river water management area, South Africa*. IWMI Research Report No. 113. Pretoria: IWMI.

- DWAF. 1994. Water Supply and Sanitation Policy White Paper. Department of Water Affairs and Forestry. Cape Town: Government Printer, South Africa.
- DWAF. 2002. Free Basic Water implementation strategy. www.dwaf.gov.za/Documents/FBW/FBWImplementStrategyAug2002.pdf
- DWAF. 2004. *Water allocation reform draft policy (2004)*. Pretoria: Department of Water Affairs and Forestry.
- DWAF. 2005. Inkomati Water Management Area: Internal strategic perspective. Pretoria: Department of Water Affairs and Forestry.
- DWAF. 2008. Inkomati catchment management strategy, status quo report www.dwaf.gov.za/IO/CMA/Inkomati/InkomatiCMASQReportMar08full.pdf
- Greenberg, S. 2010. *Status report on land and agricultural policy in South Africa: 2010*. Research Report No. 40. PLAAS. Cape Town: University of the Western Cape.
- Heathcote, I. 2009. *Integrated Watershed Management: Principles and Practice* (2nd edition). Hoboken NJ: Wiley Publishers.
- James, P. and Woodhouse, P. 2016. Crisis and differentiation among small-scale sugar-cane growers in Nkomazi, South Africa. *Journal of Southern African Studies* 43 (3): 535-549.
- Jessop, R. 2010. Cultural political economy and critical policy studies. *Critical Policy Studies* 3(3-4): 336-356.
- Kemerink-Seyoum, J.S.; Ahlers, R. and van der Zaag, P. 2011. Contested water rights in post-apartheid South Africa: The struggle for water at catchment level. *Water SA* 37(4): 585-594.
- Kemerink-Seyoum, J.S.; Méndez, L.E.; Ahlers, R.; Wester, P. and van der Zaag, P. 2013. The question of inclusion and representation in rural South Africa: Challenging the concept of water user associations as a vehicle for transformation. *Water Policy* 15: 243-257
- Kemerink-Seyoum, J.S.; Chinguno, N.; Seyoum, S.; Ahlers, R. and van der Zaag, P. 2017. Jumping the water queue: changing waterscapes under water reform processes in rural Zimbabwe. *Water SA* 43(3): 423-432.
- Komakech, H.C. and van der Zaag, P. 2011. Understanding the emergence and functioning of river committees in a catchment of the Pangani basin, Tanzania. *Water Alternatives* 4(2): 197-222.
- Komakech, H.C.; van der Zaag, P. and van Koppen, B. 2012a. Dynamics between water asymmetry, inequality and heterogeneity sustain canal institutions in Makanya catchment, Tanzania. *Water Policy* 14(5): 800-820.
- Komakech, H.C.; van der Zaag P.; Mul, M.L.; Mwakalukwa, T.A. and Kemerink, J.S. 2012b. Formalisation of water allocation systems and impacts on local practices in the Hingilili catchment, Tanzania. *International Journal of River Basin Management* 10(3): 213-227.
- Levin, R. and Mkhabela, S. 1997. The chieftaincy, land allocation and democracy. In Levin, R. and Weiner, D. (Eds), *"No more tears": Struggles for land in Mpumalanga, South Africa*, pp. 153-174. Trenton NJ: Africa World Press.
- Luks, F. 2010. Deconstructing economic interpretations of sustainable development: limits, scarcity and abundance. In Mehta, L. (Ed), *The limits to scarcity. Contesting the politics of allocation*, pp. 93-108. London: Earthscan.
- Mamdani, M. 1996. *Citizen and subject: Contemporary Africa and the legacy of late colonialism*. Princeton: Princeton University Press.
- Mather, C. 1995. Forced removal and the struggle for land and labour in South Africa: The Ngomane of Tenbosch 1926-1954. *Journal of Historical Geography* 21(2): 169-83.
- Meissner, R.; Funke, N. and Nortje, K. 2016. The politics of establishing catchment management agencies in South Africa: The case of the Breede-Overberg Catchment Management Agency. *Ecology and Society* 21(3): 26. <https://www.ecologyandsociety.org/vol21/iss3/art26/>
- Méndez-Barrientos, L.; Kemerink, J.S.; Wester, P. and Molle, F. 2016. The quest for water: Strategizing water control and circumventing reform in rural South Africa. *International Journal of Water Resource Development* 34(2): 245-258.
- Mollinga, P.; Meinen-Dick, R.S. and Merrey, D.J. 2007. Politics, plurality and problemsheds: A strategic approach for reform of agricultural water resources management. *Development Policy Review* 25(6): 699-719.
- Movik, S. 2014. A fair share? Perceptions of justice in South Africa's water allocation reform policy. *Geoforum* 54: 187-195.

- Peters, R. and Woodhouse, P. 2018. Some are more equal than others – Narratives of scarcity and the outcome of South Africa's water reform. In Bracking, S.; Fredriksen, A.; Sullivan, S. and Woodhouse, P. (Eds), *Valuing development, environment and conservation: Creating values that matter*, pp. 202-224. Abingdon: Routledge.
- PMG. 2011. Breede-Overberg and Inkomati Catchment Management Agencies: 2011/12 strategic plans, budgets, annual financial statements, key performance and priority areas. Cape Town: Parliamentary Monitoring Group. www.pmg.org.za/print/27077
- Schreiner, B. 2013. Viewpoint – Why has the South African National Water Act been so difficult to implement? *Water Alternatives*. 6(2): 239-245.
- Schreiner, B. and van Koppen, B. 2002. Catchment management agencies for poverty eradication in South Africa. *Physics and Chemistry of the Earth* 27(11-22): 969-976.
- Sum, N.-L. and Jessop, B. 2013. *Towards a cultural political economy. Putting culture in its place in political economy*. Cheltenham: Edward Elgar.
- Swyngedouw E. 1999. Modernity and hybridity: Nature *Regeneracionism* and the production of the Spanish waterscape 1890-1930. *Annals of the Association of American Geographers* 89: 443-65.
- UNDP. 2006. *Human development Report. Beyond scarcity: Power, poverty and the global water crisis* New York: United Nations Development Programme, <http://hdr.undp.org/en/reports/global/hdr2006/>
- van Koppen, B. 2008. Redressing inequities from the past from a historical perspective: The case of the Olifants basin, South Africa. *Water SA* 34: 432-438.
- van Koppen, B. and Jha, N. 2005. Redressing racial inequities through water law in South Africa: Interaction and contest among legal frameworks. In Rother, D.; Boelens, R. and Zwarteveen, M. (Eds), *Liquid relations: Contested water rights and legal complexity*, pp. 195-214. New Brunswick: Rutgers University Press.
- van Koppen, B. and Schreiner, B. 2014. Priority general authorisations in rights-based water use authorization in South Africa. *Water Policy* 16: 59-77.
- von Schnitzler, A. 2008. Citizenship prepaid: Water, calculability, and techno-politics in South Africa. *Journal of Southern African Studies* 34(4): 899-917.
- Walker, C. 2005. The limits to land reform. *Journal of Southern African Studies* 31(4): 806-24.
- Water for Africa. 2006. Inkomati WMA catchment assessment report. Pretoria: Department of Water Affairs and Forestry and DFID.
- Woodhouse, P. 1995. Water rights and rural restructuring in South Africa: A case study from Eastern Transvaal. *International Journal of Water Resources Development* 11(4): 527-545.
- Woodhouse, P. 2012. Reforming land and water rights in South Africa. *Development and Change* 43(4): 847-868.
- Woodhouse, P. and Hassan, R. 1999. *Implementation of South Africa's National Water Act. Catchment management agencies: Interests, access and efficiency. Inkomati Basin pilot study*. Rural livelihoods Working Paper 12. Manchester: University of Manchester. http://hummedia.manchester.ac.uk/institutes/gdi/publications/workingpapers/archive/rr/rr_wp12.pdf
- Woodhouse, P. and James, P. 2015. *Land reform and sugarcane farming in the Mpumalanga Lowveld*. Working Paper 3. Project "Farm scale and viability: An assessment of black economic empowerment in sugar production in Mpumalanga Province, South Africa". Manchester: University of Manchester. <http://hummedia.manchester.ac.uk/institutes/gdi/research/research-programmes/Working%20Paper%203%20-%20final.pdf>
- Young, G.; Dooge, J. and Rodda, J. 1994. *Global water resource issues*. Cambridge: Cambridge University Press.

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