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Research paper

Water governance and river basin management: comparative experiences from Nigeria and Tanzania

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ABSTRACT
The paper compares and contrasts approaches to river basin management in Nigeria and Tanzania. Working from a water governance perspective, the paper discusses the resource base in each catchment, looking separately at both material (physical) and non-material (infrastructural) resources. It then goes on to describe how these resources are drawn on to develop mechanisms for water governance and basin management. Significant changes have taken place in both basins over the recent past and are still continuing. The paper analyses these changes in terms of outcomes for the people in the basins and for ecosystems.

Keywords: Water governance; river basin; Tanzania; Nigeria

1 Introduction

Over the past few years, the discourse in water resources has centred on three key concepts. Perhaps the most widespread of these is integrated water resources management, which emphasizes the important links between water and other sectors. The most notable links are the contributions of water to energy and food production (Akpabio 2007), but there are many other important linkages, such as between water and health and water and transport. It seems self-evident that a basic resource such as water should not be planned and managed in isolation from other sectors, and therefore the concept generally arouses little criticism. A few authors such as Biswas (2008) and Butterworth *et al.* (2010) have questioned the validity of the concept, mainly on the basis of its lack of clarity, but it is widely accepted as a theoretical and working approach.

A second element of the discourse lies in river basin management. This addresses the spatial dimension of water in taking the catchment or drainage basin to be the 'natural' unit of management. The idea has a long provenance, as reviewed by Barrow (1998), going back in history but given impetus over the past century or so with the developments of the Tennessee Valley Authority and now brought up to date through the work of the European Union on the Water Framework Directive and others (see, for example, Adeoti (2007) for a discussion of its application in Nigeria). The idea of the basin as the natural unit of management is given support by those with an interest in the cultural and symbolic value of water, such as those who focus on the linkage between water and landscape (Fontein 2008). Criticism of river basin management comes from those who suggest that there is nothing natural about management based on hydrological boundaries, particularly in a modern globalized and interconnected world (Warner *et al.* 2008). In particular, most nation-states manage their affairs across river basin boundaries and examples abound of management of transboundary waters.

The third element of the discourse on water resources lies in the emerging concept of water governance. As with integrated water resources management and river basin management, there seems little contentious in the need for good water governance. However the concept does cover a range of competing and disparate ideas, which were investigated in the seminar series 'Water Governance: Challenging the Consensus' (Franks 2006). For example, there is considerable interest in normative attributes such as capability, accountability and transparency, which are often taken up in the notion of good governance. This is most commonly linked to concepts of the state and actively promoted by the World Bank and other funding agencies

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(Kaufmann *et al.* 2005). Another group of writers see governance as the linkages between key domains or themes in public life, such as government, society and science (Hattingh *et al.* 2007). Yet another group look on governance as the systems put in place to order society's affairs (Goldin *et al.* 2008). This viewpoint has been taken up the UN and is sometimes characterized as 'rules without rulers'. Here we follow this perspective in using a working definition of water governance as:

> the system of actors, resources, mechanisms and processes which mediate society's access to water.

This definition underlies a framework which was developed by Franks and Cleaver (2007) to deepen the understanding of water governance and to provide a way of analysing and mapping its practice in specific situations (Figure 1).

Within this framework, actors include not only governments as a key player, but also the public, private and third sectors, as well as private citizens who can exercise agency in mediating access to water. These actors draw on material (allocative) and non-material (authoritative) resources to create mechanisms of access, which themselves can take a multitude of forms. The linkage between resources and mechanisms implies an interplay of politics and power relations which is a pervasive theme of much current writing on water development, but which is often absent from policy papers and plans. Mechanisms of access lead to outcomes, for people in terms of livelihoods, wellbeing, social capital and political voice and for ecosystems. These outcomes arise as a result of a range and combination of mechanisms put in place, rather than specific or individual mechanisms. The connections between resources, mechanisms and outcomes are recursive and are themselves mediated by processes of management and practice. As outcomes change, resources change, former mechanisms of access become modified and new mechanisms may appear.

This framework for understanding water governance has so far been focused at the local level and in rural areas, beyond the reach of many poor states. Notions of governance are particularly relevant where governments are incapable of providing basic services such as water. In such situations, people in society have no option but to organize their own systems, drawing on available resources to arrange mechanisms of access. This is not a normative concept – the mechanisms of access may be exploitative and unsustainable – but a descriptive concept, as a way of understanding what people actually do. While it seems to have validity as a way of understanding governance at the local level, it is widely recognized that one of the challenges facing water development is to scale-up processes, from the local level to the basin level and beyond to where the state plays the dominant role. Another challenge is to understand how governance systems operate in urban and peri-urban areas, in a dynamic and fluid context of complex and multi-faceted relationships.

The intention of this paper is to examine the concept of water governance at the basin scale, while situating it firmly within the framework of IWRM and RBM. The focus of the paper is on a comparative study of the Komadugu Yobe basin (KYB) in NE Nigeria and the Great Ruaha catchment (GRC) in SW Tanzania. These basins have a number of significant similarities, in that they are of similar size and particularly that they both contain large and important wetlands. There are also important differences, not least in the institutional and political framework in which water governance and management is carried out. The analysis is presented in Table 1, which summarizes the main features of each basin in terms of its resources, mechanisms and outcomes.

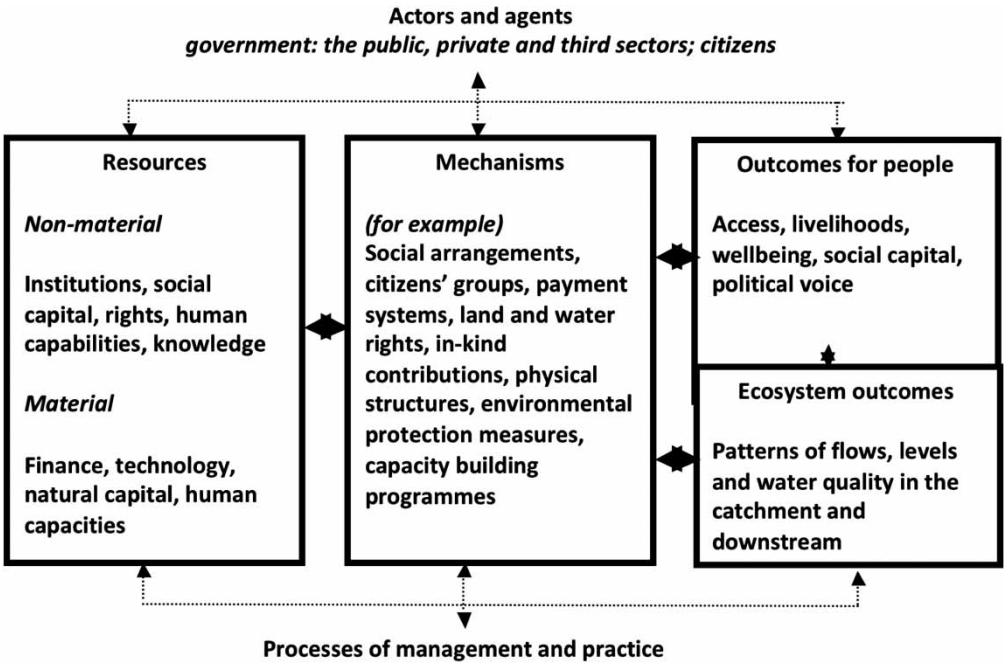

Figure 1 A framework for water governance.

Table 1 Water governance in the KYB and GRC.

		KYB (*ad hoc*, flexible)	GRC (formalized, structured)
Resources	Material (allocative)	Major water courses and significant wetland. Groundwater, grazing and forestry	Many minor water courses and significant wetland. Grazing and forestry
	Non-material (authoritative)	International, federal and state institutions.	National and local state institutions.
		Non-state actors (including traditional rulers)	Non-state actors (socially-embedded and evolving)
		Legislative framework	Legislative framework
Mechanisms	Institutions	International partners (e.g. Lake Chad Basin Commission, Ramsar)	
		Basin management through the KYB Trust Fund, or KY Basin Office	Basin management through Rufiji Basin Water Office, with sub-offices
		Stakeholder Consultative Forum (*ad hoc*)	Consultative Committee (formalized)
		WUAs, mainly for hydrometric purposes	WUAs with water rights and fees
		Water policy and legislation under revision	Water Policy 2002 and Water Resources Management Act 2009
			Use of legislation to exclude human access in the wetland
	Financing	State and development project funding	State and development project funding
			Part-financing of Water Office through user fees
	Technology	State-funded gravity irrigation. Surface water extraction for urban use. Extensive pumping of groundwater	State and privately funded gravity irrigation systems
Outcomes	Ecosystems	Closed basin (significant changes due to typha grass infestation)	Closing basin (change to seasonal flows downstream)
	Access and livelihoods	Urban and irrigation uses take priority	Irrigation uses take priority. Access to wetland excluded by legislation
	Inclusion and voice	Active stakeholder participation but formal institutions for RBM still evolving	RBM institutions in place with formalized stakeholder participation

In the following section, the system of resources, mechanisms of access and resulting outcomes in each basin are described in more detail, leading to a comparative discussion of water governance at the basin level in the final section.

2 Comparative analysis

2.1 *The natural resource base*

In reviewing the resource base from which mechanisms for water governance are drawn, we start first with the physical and natural resource base of the two basins.

The Komadugu-Yobe basin lies at latitude 12°N in the semi-arid north-east region of Nigeria, in an area with a mean annual rainfall of 480 mm. The basin covers an area of 84,000 km^2 and is home to a population of around 30 million. It is formed from two major rivers, the Hadejia which rises from the Kano Highlands to the West and the Ja'amare which rises in the Jos Plateau to the South. The two rivers meet in the centre of the basin, where they form the Hadejia Nguru Wetlands and the Yobe River which flows East to discharge into the Chad Basin (Figure 2). The Komadugu River, which originates from the Jos Plateau, joins the Yobe River 200 km before it empties into Lake Chad.

The Great Ruaha Catchment lies in the south-west of Tanzania, at latitude 8°S. It too is in a predominantly semi-arid region, with a mean annual rainfall of 600 mm in the plains. The Great Ruaha River originates in mountain ranges in the SW of the basin and flows eastwards through the basin to meet the Kilombero River further downstream to form the Rufiji, which discharges to the Indian ocean (Figure 3). The catchment covers about the same area as the KYB and has an estimated population of 2.8 million.

An important similarity of the two basins is that they are both the locations of internationally important wetlands. The Hadejia-N'guru wetlands lie at the confluence of the Hadejia and Ja'amare rivers in the KYB, forming a seasonal wetland with a maximum extent of around 30,000 ha. The Usangu wetland in the GRC is also seasonal, growing to 10,000 ha at the end of the rainy season. In each case, the wetland forms the key feature of the river basin landscape, providing a range of important hydrological functions and ecosystem services. In particular, the excellent grazing resources resulting at the end of the rainy season mean that they are potentially important as locations for livestock and transhumant pastoralism.

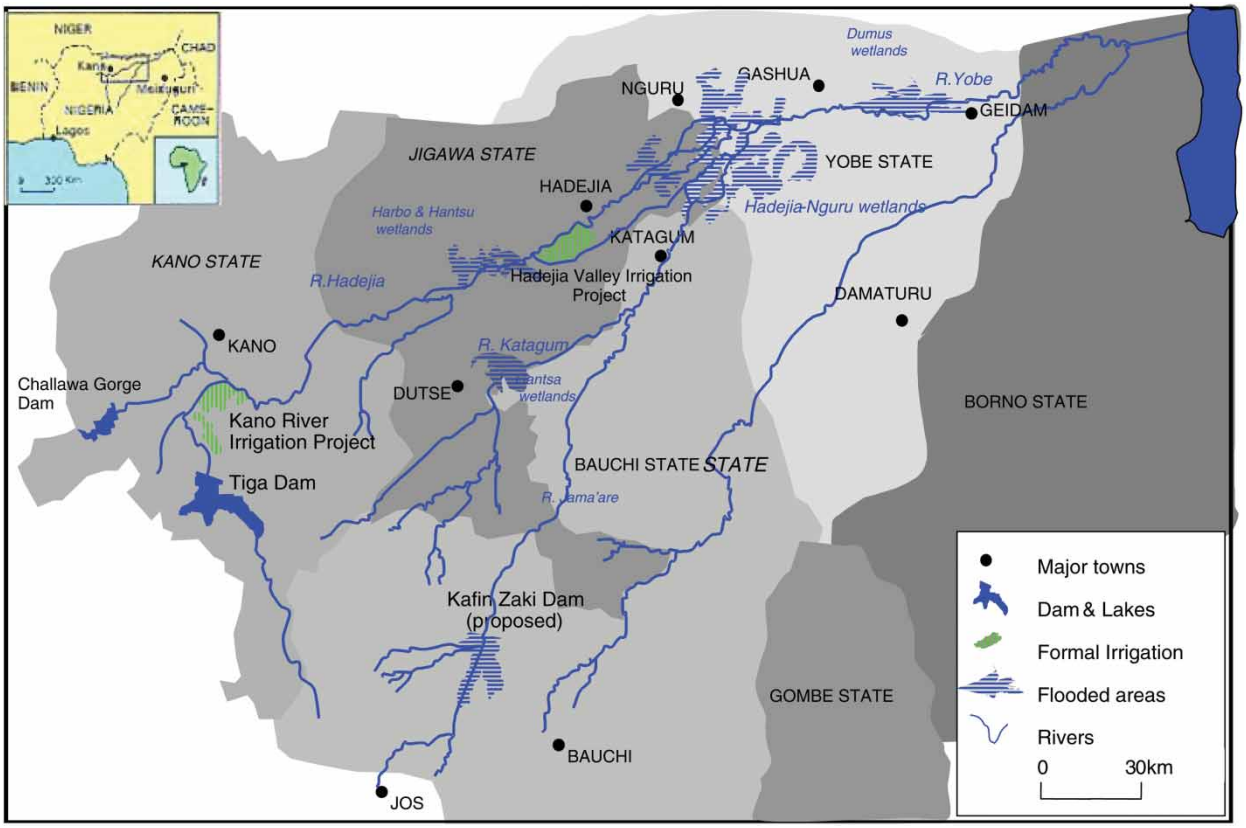

Figure 2 The Komadugu–Yobe Basin.

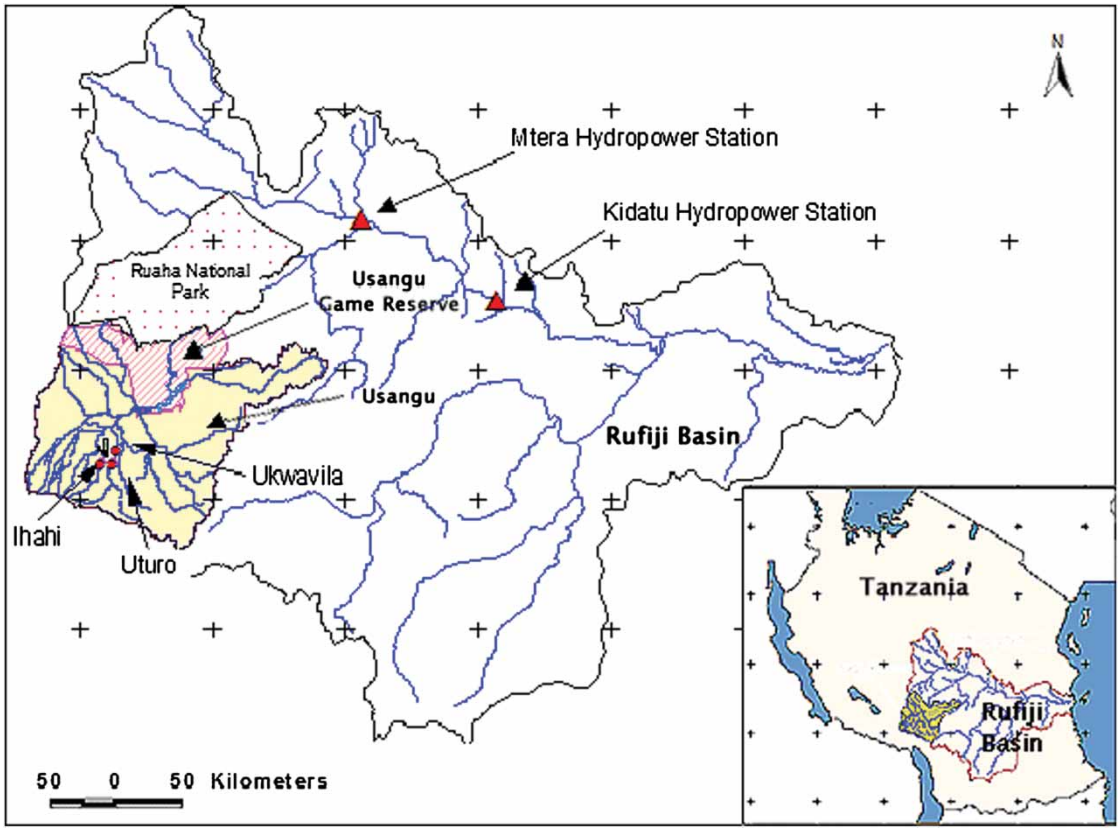

Figure 3 The Great Ruaha catchment.

2.2 *Institutional resources*

A range of institutional resources are available to support water governance in the basins. In this case, the difference between the basins is quite marked, particularly with regard to their overall political context. For the KYB, this is set by its international location and, nationally, by the federal system under which Nigeria operates. The KYB lies partly in Niger and discharges downstream into the Chad basin, which is shared with international riparian neighbours. Stakeholders in the basin therefore participate in a number of international networks and can draw on international support for regional development efforts. Within Nigeria, the basin occupies part or all of six states (Kano, Plateau, Jigawa, Yobe, Bauchi, Borno) and is subject both to the state and federal administrations. There is on-going tension between the states and the centre, and politicians and civil servants operating from a local base can wield considerable power. The GRC, by contrast, lies entirely within the borders of Tanzania, which is in any case a unitary rather than a federal state. Therefore, there is less opportunity to link to international institutions, but the power and influence of politicians and civil servants operating at the national level from Dar-es-Salaam is much more pronounced.

The arrangements for local government are broadly similar, drawing as they do from the British colonial tradition. In Nigeria, it consists of the single tier of 'Local Government Area' below the state, and there is little formal organization of local government below the local government area. Tanzanian local government is divided principally into Districts and Villages.[1] The districts are important providers of public services while villages form an extensive network for political organization down to the household level. This network was established after independence by Nyerere and has survived to the present day, albeit with less influence than heretofore.

A significant system of non-state institutions exists in both contexts, underlain, in many instances, by ties of kinship and ethnicity. In Nigeria, these take the formal shape in the system of traditional rulers (known as emirs), whose influence may extend over large areas. No comparable system exists in Tanzania, though respect for elders is a long-standing custom. In both locations, a range of civil society organizations exist for bringing people together at the local level. More recently, a wide variety of NGOs have become established, reflecting the international focus on NGOs as key players in the development process.

Both Nigeria and Tanzania have established policy-making and legislative frameworks, with differences reflecting the differences in their political systems. In the case of Nigeria, national policy and laws are enacted at the federal level through the National Assembly but jurisdiction is balanced by legislation enacted at the state level. In Tanzania, policy-making and legislation are centralized at the national level, with implementation devolved to the districts and below.

2.3 *Mechanisms for water governance*

A variety of mechanisms for water governance are drawn from the natural and institutional resources available to the stakeholders in the basins. While many of these mechanisms are similar, there are some important differences between them. These arise from the different patterns of resources available to the two sets of stakeholders. First, the KYB is an international basin, lying in two countries and discharging to Lake Chad which is shared by four international riparian neighbours. Governance of the KYB is therefore influenced quite strongly by international mechanisms and networks. While the importance of such mechanisms should not be overstated, it is relevant to note that parts of the Hadejia-N'guru wetlands are registered as a Ramsar site and that Nigeria, along with its neighbours, has established the Chad Basin Commission which has been able to draw on financial and other support resources from the international community such as the Global Environmental Facility. Tanzania, by contrast, has not been very active in locating the GRC within this international framework, though from time to time there has been discussion of registering the Usangu as a Ramsar site.[2]

At the national level, both Nigeria and Tanzania follow standard practice in dividing their countries into river basins. The basins form the focus of systems of water governance, allocation and management, though the institutional approaches differ, reflecting the different institutional framework and resources. In the case of the KYB, there is as yet no co-ordinating basin office with overall responsibility for the KYB. For the time-being, this responsibility is shared between the riparian states and the federal authorities in Abuja, and there is some unresolved tension between these two institutional systems. The states have established the Hadejia–Ja'amare–Komadugu–Yobe Basin (HJKYB) Trust Fund, resourced from state and federal government funds and with international support, which is intended to take this co-ordinating role. It is interesting to note that the establishment of the Trust Fund benefited from the state and governorship system in Nigeria, with the strong element of political competition ensuring that none of the riparian states wanted to be omitted from the emerging institution. Subsequently, the Federal Ministry of Water Resources has set up a KYB Basin Office, located in a different state. The power and influence of the Trust Fund and the Basin Office relative to one another are yet to be seen.

The case of Tanzania, with its unitary state system, is more straightforward. Tanzania has established nine lake/river basin offices, with overall responsibility for allocating and managing water resources within their jurisdiction. The GRC lies within the Rufiji Basin and is administered by the Rufiji Basin Water Office (RBWO), whose headquarters lie some 250 km downstream. The RBWO is staffed by civil servants, and there is none of the direct political interest that is found in the setting up and running of the HJKYB Trust Fund. In view of the relatively large size of the Rufiji Basin (177,000 km^2), and the

difficulty and inaccessibility of some parts of it, the RBWO has established a sub-basin office within the GRC. This reflects perhaps an increasing interest in Tanzania in devolving management structures to a more local level, with a greater importance given to catchments within basins, at least for the Rufiji basin. Division into catchments may also make more sense for the Rufiji Basin than for the KYB because of the layout and landscape of the basin, which draws its water from a larger number of smaller rivers than does the Komadugu-Yobe basin.

Formal mechanisms in each basin at the government level are mirrored in each case by mechanisms for involving stakeholders in water governance. For the KYB, a Stakeholders' Consultative Forum has been established, which brings together state legislators, civil servants, traditional rulers and resources users. Membership of the Stakeholders' Consultative Forum is relatively loosely defined and a new representation can be invited in as appropriate. Meetings are held on an *ad hoc* basis, on average about once per quarter. For the GRC, by contrast, the RBWO is advised by a formally established Consultative Committee of 12 members, comprising representatives of irrigators, livestock keepers, women's groups and local government, with the basin water officer acting as secretary to the board.

Stakeholders in both basins see water users' associations (WUAs) as important mechanisms for water governance at the local level. In the GRC, in particular, significant efforts and resources have been put into setting up WUAs, and some of these, such as the Mkoji WUA near Mbeya, have gained some recognition at national and even international levels (Mehari *et al.* 2009). The same intensity of effort does not seem to have been expended in the KYB: though there are indeed a number of WUAs in existence, they do not have the same prominence.

Some interesting comparisons can be made between the two basins in relation to the mechanisms for water governance which are drawn from their respective legal frameworks. Both countries have been active in developing new water policies and legislation, following the international trend after the Dublin and Rio conferences of the 1990s. In the case of Nigeria, the negotiations are still on-going, reflecting the vigorous tensions between the federal authorities and the states over where responsibility for managing water resources should lie. In the case of Tanzania, a national water policy was published in 2002, followed by the water resources management act of 2009 which updated earlier water-related legislation and confirmed management of the nation's water resources at the basin level through regional water boards and water offices (Lein and Tagseth 2009).

It seems that Tanzania is more active in drawing on the legal framework to establish water governance processes. Most notably, Tanzania gazetted the Usangu wetland as a game park in 2009, thereby excluding traditional water users such as pastoralists and fisher people by force. This was in response to perceived over-use, particularly by the pastoralists, in the preceding 15 years. Pastoralism and competition over water and grazing resources has been a feature in both basins for a considerable time (Franks *et al.* 2004) but stakeholders in Nigeria have not seen the legal framework as providing a suitable response mechanism and have tried to follow other approaches in dealing with it, such as the development of a water charter and a catchment management plan. Basin-level stakeholders in the KYB have taken this as the expedient approach, as they see less chances of success in persuading disinterested federal-level civil servants and functionaries, as well as legislators, to develop and pass the needed legislation.

In line with the use of legislation to control access to water, it seems that Tanzania has in general been much more active than Nigeria in trying to establish an approach to water governance at the local level based on water rights and permits. Nigeria maintains a register of water users in the KYB but this is more to support the hydrometric database, rather than any active attempt to influence patterns of water use. In Tanzania, by contrast, the system of water rights and permits is well established and, in theory at least, individual or collective water users (such as WUAs) pay an annual fee for a permit to abstract water. The fee is based on the pattern and volume of water abstraction and is intended to create incentives for better water governance, as well as supporting part of the operations of the RBWO.

A range of mechanisms are in existence to draw on the financial resources available to the stakeholders in each basin. These tend to be fairly standard forms of government financing, involving transfers of funds from the centre (Tanzania) or the centre and the states (Nigeria) to support, for example, the respective operations of the RBWO and the HKJYB Trust Fund. Local funding mechanisms through farmer subventions (but also supported by government funding) are in place to support the operations of WUAs. Little use is yet made in either basin of such innovations as direct payment for ecosystem services by downstream users to support water conservation practices by upstream users.

Both Nigeria and Tanzania use their status as 'developing countries' to draw on mechanisms of financial and institutional support from the international development sector. This is done primarily through the project-financing mechanism, and both basins have been the locations for a continuing programme of development projects. These started with the river basin master plans which were fashionable in the 1970s, moved in the 1990s to a focus on the wetlands and have subsequently changed again to focus on institutional change and support for small-scale and small holder uses, such as local irrigation improvements and channel clearance. These changes reflect changes in approaches to water development more generally. They have been financed by a number of different donors[3] but have had broadly similar outcomes in each location. One aspect of the externally funded projects lies in the opportunity they provide to update and upgrade databases for the basins. This relates particularly to hydrometric data, where internal systems for regular data collection have generally all but collapsed.

In this discussion, we have made little mention of mechanisms for water governance which arise from their physical endowments and landscape. In both basins, there has been an extensive development of surface water sources for irrigation, led by the state but in Tanzania also involving extensive smallholder initiatives. However, there is one significant point of difference between the two basins in regard to physical mechanisms of access, in that groundwater plays little or no part in water governance in the GRC (mainly because it is too deep and too dispersed to allow for systematic exploitation). In the KYB, the fadama system of exploiting river and flood plain water through shallow wells and pumps allows irrigators to manage their own sources directly, without significant interaction with other users in this respect.[4]

2.4 *Outcomes*

The practices and processes of water governance over many years have outcomes, for the people who live in the basins and for their ecosystems. The ecosystem outcomes are strongly influenced by the balance of water availability and use and whether the basins are now closed or closing. The evidence is that the KYB is a closed basin. For example, it has been calculated that estimated demand for surface water in the Hadejia River exceeds available supply by 2.6 times (IUCN 1999). In addition to growing demand leading to closure, there have been significant changes in the KYB, particularly related to the wetland and its environs, resulting from a dramatic increase in infestation by typha grass. No specific causes for the increased infestation have been identified, although it is strongly suspected that the dam operation that turned annual rivers into perennial rivers is a major contributor. Typha grass infestation has led to major changes in flow patterns, with flooding upstream and reduced flows downstream, as well as reduction in fish catches and loss of other productive uses. One of the major aims of the HJKYB Trust Fund and the Stakeholders' Consultative Forum is to address these issues. This is being done through mainly small-scale and localized measures, which are showing some success at the local level. Large-scale changes for the better are yet to be seen. In the KYB, unlike the GRC, the ultimate downstream use is not particularly relevant in driving change to water governance systems, since the contribution of the KYB to the Chad Basin has always been relatively small (about 5%).

Calculations on the degree of closure of the GRC are not available but there are visible indicators of closure (and of change in the hydrological system). The Ruaha River downstream of the Usangu wetland changed from a perennial river to a seasonal river in the mid-1990s, with serious impacts on the Ruaha Game Park (the immediate downstream user) and the important system of hydroelectric dams further downstream. The causes of these changes have been the subject of intense and heated debate, with many influential stakeholders putting the blame on the pastoralists. However, there is evidence that the numbers of livestock on the wetlands were being wildly exaggerated, and it seems much more likely that the causes lie in a very great increase in upstream irrigation, particularly from abstraction at the end of the dry season, when compensation flows into the wetland are especially important. Paddy irrigation has been an increasingly important water use in the basin and now extends to 55,000 ha (about 40% of the total potential in Tanzania).[5] A number of measures have been taken to address the issue, including efforts by the RBWO sub-office to discourage irrigation at the end of the dry season, as well as the gazetting of the wetland as an extension to the Ruaha National Park to exclude pastoralists. Since these are going on in parallel, it will be difficult to disentangle their relative importance.

Outcomes for the stakeholders in the basins take a number of forms. First, we can think in terms of access, livelihoods and well-being, where differences between the basins can be distinguished on the basis of their layout and landscape. In KYB, the city of Kano upstream represents a major use of domestic and industrial water, with the potential to take an increasing share of the available resources. Downstream of Kano, water users are more dispersed and varied, with domestic and agricultural uses competing with others such as the environment (the wetland), fishing and livestock. As noted above, perhaps the most important development in recent years has been the increased prevalence of typha grass which has had significant impacts on access and livelihoods for those living in the vicinity, both upstream and downstream. For the GRC, the majority of the individual stakeholders live in the upstream part of the basin and their access and livelihoods have tended to at least keep pace with increasing demand through increased abstraction at these points. However, a notable group of losers are the pastoralists and fishers who depended directly on wetland resources for their livelihoods and who have become increasingly marginalized. Downstream users have tended to lose out but the major users are the game park and the hydro-electric system. Access and livelihoods are not relevant concepts through which to examine outcomes on these users, though it is worth noting that the drying up of the river in the game park during the dry season does have significant impact on the wildlife in the park.

Secondly, changing patterns of water governance in the basins have important outcomes for the stakeholders in terms of social and institutional arrangements and political voice. As noted above, considerable efforts have been expended in both locations to develop institutions which are better able to tackle the range of water governance issues facing them, ranging from the national and local level formal institutions (the HJKYB Trust Fund, the RBWO and their attendant stakeholder forums) to the WUAs which are charged with local-level water management. While there are only *ad hoc* investigations of the way these different institutions have performed, it seems likely that one outcome has been an increased voice for local and non-state actors in the processes of water governance, which in turn is likely to have some effect on the practice of governance more widely in their respective societies.

3 Conclusion

Some important lessons can be generalized from a comparative review of the KYB and GRC through the perspective of water governance. First, both basins have experienced significant changes in the recent past (since the 1970s), and the pace of change seems to be increasing. The drivers of change appear to come predominantly from social and economic forces, such as increasing population, and a rising demand for water for an expanding range of uses, such as power generation and the ecosystem services provided by wetlands. Up till now, it seems that socio-economic drivers of change are more important than biophysical drivers, such as climate change. The direction and magnitude of climate change (rainfall and river flows) over recent decades is not clearly established in either basin (Conway *et al.* 2009).

Secondly, a complex range of responses to drivers of change can be seen in each basin. Some of these responses are in the biophysical realm, involving technical solutions to perceived physical problems (e.g. Lankford 2001). Examples include the digging of relatively small channels in the Hadejia–N'guru wetland to relieve localized flooding caused by typha grass infestation. In the GRC, consideration is being given to building a small storage dam on one of the eastern tributaries to the Usangu wetland, in order to augment late dry season flows. It will be interesting to see if this proposal moves to implementation, in the light of current opposition to storage dams. Other responses to change are institutional. Perhaps, the most notable of these is the gazetting of the Usangu wetland, in order to exclude pastoralists (and other wetland users such as fishers) who are perceived to be the main cause of reduction of flows downstream. The threats to pastoral production systems in both basins resulting from a range of linked and emerging forces provides a vivid example of the changing context of basin management.

Water governance provides a useful lens through which to understand how stakeholders respond to the challenges of basin management in the KYB and the GRC. In this paper, we have used the concepts of resources, mechanisms and outcomes to describe the key components of water governance and to identify the main differences between the two basins in this regard. We outlined our analysis in Table 1, from which we have drawn a number of key conclusions in the discussion.

In drawing these conclusions, it is important not to link particular outcomes to specific mechanisms of access, but rather to the generality of mechanisms put in place. It follows also that the framework provides a basis for analysis and mapping the complex relationships that underlie water governance and river basin management in each case and cautions us against applying single approaches to individual problems and issues.

Overall, approaches to water governance in KYB appear to be more *ad hoc* and flexible, building on a range of mechanisms (international, national and local) and in particular reflecting the tensions inherent in a federal system such as Nigeria's. This can be seen in the on-going debate as to whether responsibility for river basin management should ultimately lie with the federal government or with the states. The strong political nature of the relationships between the states (and state governors) and the centre also has a significant influence on the way that water governance plays out in the basin. In Tanzania, by contrast, we can typify water governance as more formalized and structured, reflecting the strong unitary state and the importance of the bureaucracy as a key stakeholder. In addition, there are more extensive efforts in the GRC to apply legislative mechanisms to the challenges of basin management, for example, in awarding rights and imposing fees on WUAs. Gazetting the wetland as a national park to exclude water users through command and control is another striking example of the use of legislative mechanisms to affect outcomes.

Our comparative analysis of the two basins over the past 40 years shows that water governance does indeed provide a useful perspective from which to view development in each basin. In particular, it moves us beyond the concepts of integrated water resources management and river basin management discussed in the introduction: these tend to be technocratic in their outlook and focus on the actions of government and the bureaucracy. Water governance suggests a more nuanced and holistic approach, encompassing the whole range of users and uses in the basin, and the complex systems put in place at all levels to manage water resources. The framework for water governance (resources–mechanisms–outcomes) provides a useful context for analysing the range and linkages of the diverse drivers of change and responses of the stakeholders in the basin. Viewing water governance as a framework with its constituent components provides a basis for understanding the processes which are at work, rather than approaching the issues through the normative outcomes of 'integrated water resources management' or 'river basin management'. This paper discusses our analysis of two significant basins in sub-Saharan Africa, as a basis for extending the analysis to other basins in the same region and perhaps beyond. Currently our interest lies in basins which contain significant wetlands (the Pongola in South Africa and the Baro Akobo in Ethiopia), since wetlands provide an important focus for the challenges of water governance.

What of the future? We can see a continuing need to develop processes of water governance that operate at all scales from the local to the basin scale and indeed internationally. Along with a move from bureaucratic technology-led approaches to water resources management based on IWRM and RBM (Jaspers 2003), we can also see a trend towards more open flexible *ad hoc* responses to specific and localized situations. These trends, with their competing discourses, are discussed at some length in relation to the GRC and the KYB by Lankford and Hepworth (2010) using the metaphor of the cathedral and the bazaar. Water governance fits easily with these developing approaches, enabling us to understand and support the flexible adhocracy of water management in practice at the local level (Neef 2009), but the processes by which this might operate at the basin scale are still little understood and need further investigation. In addition, while acknowledging that governance is not government, but a

much wider and all-encompassing concept, there is nevertheless a continuing need to integrate more closely the role and actions of government within the wider process of water governance. The future directions of biophysical and institutional responses in the KYB and GRC will depend markedly on how questions of scale and the role of government are incorporated into the systems of water governance that evolve in each basin.

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Notes

1. There is also a grouping of districts into provinces but the provincial administration has comparatively little direct input into administration.
2. Birdlife International, an international conservation NGO, has been active in the Usangu wetland on occasions.
3. International NGOs have also been active in funding projects in the basins
4. The closest analogy in the GRC is the use of 'vinyungu' cultivation on the banks of water courses but this is much less extensive than fadama irrigation.
5. In the KYB, irrigation, while still important, takes a smaller share of the available resources because of other large users such as Kano city.

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