

The language of sustainability: a missing piece of the IWRM puzzle?

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The looming water crisis as experienced by water stressed South Africa means that the country is faced with a need to review its water management approach. Instrumental in moving forward is the fundamental recognition that priorities for managing water have shifted where the concern for sustainability has become paramount. Bringing catchments to the point where they can become units for sustainable management cannot happen without adjustment to current practices and this cannot happen without the development of the appropriate 'management language'. From an assessment of the status of sustainability for six river systems we explain three key findings: firstly, the requirement for a 'new shared discourse' across all sectors and institutions at catchment level, secondly, a need for learning to use new 'tools' that focus on the practicalities of achieving sustainability (i.e. environmental water requirements), thirdly, support for institutions and multiple stakeholder platforms that can potentially hold adaptive management processes.

Sustainability, Adaptive water management, National Water Act

INTRODUCTION

The National Water Act and sustainable water resources management

The promulgation of South Africa's acclaimed National Water Act (NWA) (Act 36 of 1998) was intended to address both the inequities of past water allocations and concerns of growing unsustainable use (DWA 2004a). The NWA is intended to provide the basis for a new and fundamentally different way of managing the nation's water resources. Together with the White Paper for National Water Policy (which sets out 28 principles; DWA 1997), it challenges the policies and values of the past by framing water resource management within the context of two fundamental principles: equity and sustainability (NWA 1998). These principles are strongly transformatory in nature, seeking to introduce a new management discourse of integration, redistribution and equity in allocation, sustainable use, resource protection and participation (see preamble to NWA).

South Africa's formalised transformation plan is captured in the concept of Integrated Water Resources Management or IWRM defined as "*a philosophy, a process and a management strategy to achieve sustainable use of resources by all stakeholders at catchment, regional, national and international levels, while maintaining the characteristics and integrity of water resources at the catchment scale within agreed limits*" (DWA 2003). It therefore aims to strike a balance between the use of resources for livelihoods and its protection for future generations, whilst promoting social equity, environmental sustainability and economic efficiency (DWA 2004a).

The looming water crisis where South Africa faces a situation of deficit (Movic, 2010) in terms of resource availability by 2015 (DWA 2004a) has meant that the country has had to review its management approaches and seriously consider the implications of unsustainable practice. To this end the management priorities have shifted (Folke 2003) from 'business as usual' or, more succinctly, from management within a context of abundance to deficit (Movic 2010). Sustainability has therefore become of paramount concern, at least for

the national custodian of water resources (DWA 2004, DWA 2007). The adoption of IWRM as a national policy has resulted in the introduction of a 'sustainability discourse' with new concepts, practices and approaches. Practitioners' ability to access this discourse is an important first step in making the transformation from the 'old' to the 'new'. However, this may not be a straightforward process as tensions might arise in making the change. New concepts might conflict with, and/or contradict practices that have been part of previous legislation and water management of the past. Earlier work in the lowveld catchments reports that at almost every level of the water sector and civil society there is conceptual conflation and a basic lack of clarity as to what new policies and legislation imply for actual practice (du Toit 2005; Biggs and du Toit, 2008).

In this paper we look at current levels of understanding of the key instrument for sustainable management and resource protection, the Ecological Reserve (King and Brown 2006). We draw on a three-year study known as the Shared Rivers Initiative (SRI) (Pollard & du Toit 2011), that examined the multiple factors that both constrain or enable compliance with the National Water Act (NWA) and hence the implementation of IWRM. The focus of the study was on the six river basins comprising the *lowveld* - a term referring to the vast plains between the escarpment in north-eastern South Africa and the coast of Mozambique (Figure 1). The study revealed that sustainable management of these freshwater systems was only likely with attention to: integrated approaches, especially between water resources management and supply, the role of leadership, governance and collective action, the strengthening of regulation, attention to self-organisation in management processes and, the emergence of a shared discourse on sustainable water resources management across all sectors. In this paper we touch on all findings but focus specifically on the emergence, or lack of emergence of, a sustainability discourse amongst managers and users and deliberate on the consequences for sustainable management in South Africa.

METHODS

The research process involved a two-pronged approach to address a number of overarching objectives, the second of which is central to this paper whilst the first sets the context. The first objective was to examine the status of compliance with the Ecological Reserve as a measure of the realisation of the Act and progress towards sustainable water resources management. Thus the first step comprised a quantitative assessment of compliance with the Ecological Reserve (quantity requirements) prior to, and following, the promulgation of the NWA (see Pollard, et al. 2011). The research output of this stage provided an assessment of whether there was non-compliance with the Ecological Reserve or not.

Secondly, in order to understand factors that both enable or constrain meeting the EWRs, a qualitative dialogical-research approach was adopted. This entailed interviews and discussion with key stakeholders both within catchments and at the national level using the framework for IWRM as the basis for thematic areas of interest (see Pollard & du Toit 2011). Stakeholders were selected from six catchments that formed the basis for this study. For the purposes of this paper the results are analysed according to the three main Water Management Areas (WMAs) into which the catchments fall (Figure 1).

Data for this study was collected by means of semi-structured interviews with respondents from the five categories listed above. The interviewees were drawn from a variety of organisations involved in water management, representing a spectrum of viewpoints. The research was undertaken at a catchment scale although key issues were also examined at a national perspective and regional perspective where appropriate.

A total of 125 interviews were held over the course of two years. Interviewees were chosen to represent the following broad groupings within a catchment:

1. Regulators

- a. National Department of Water Affairs (DWA)
- b. Regional DWA
- c. Satellite DWA offices
- d. Government Departments where appropriate (e.g. Department of Agriculture, Department of Environmental Affairs and Tourism, Department of Mineral Resources)

2. Water users

- a. Water User Associations (WUA)
- b. Irrigation boards (IB) or commercial farmers associations
- c. Co-operatives
- d. Municipalities as Water Services Authorities or Providers (WSA/WSP)
- e. Mining
- f. Industry
- g. Other users (e.g. Eskom)
- h. Government departments who act as representatives of users e.g. Department of Agriculture schemes

3. Operations and maintenance

- a. Technical staff
- b. Dam operators

4. Researchers

- a. Consultants and academics

5. Other interested and affected parties

- a. E.g. Working for Water/ Wetlands

Themes were extracted from the data where evidence was supported across several sources. However, it must be acknowledged that in some cases only one interviewee was selected from a particular stakeholder category. This means views expressed may not represent organisational perspective or be representative of similar stakeholder groups. The original study reported in Pollard and Du Toit (2011) also made use of case studies to support positions.

During the discussions each respondent was asked whether they had heard of the Reserve, and, if they had heard of it, what level of understanding they considered themselves to have. Of interest to this study was the nature of constructs that exist in relation to the concept of the Reserve - as respondents articulate them. The responses are taken reflect how the Reserve, and hence the main sustainability 'tool' for freshwater management has been taken up by the different sectors and institutions some 13 years after its promulgation.

Overview of the case study basins

A detailed description of the six catchments that form the basis for this study is beyond the scope of this paper. However the study area can be summarised as six river catchments comprising the *lowveld* - a term referring to the vast plains between the escarpment in north-eastern South Africa and the coast of Mozambique (Figure 1). A full description of the study site is provided in Pollard and Du Toit (2011). For the purposes of this study the catchments are grouped together into three Water Management Areas (WMAs) into which the fall under the NWA.

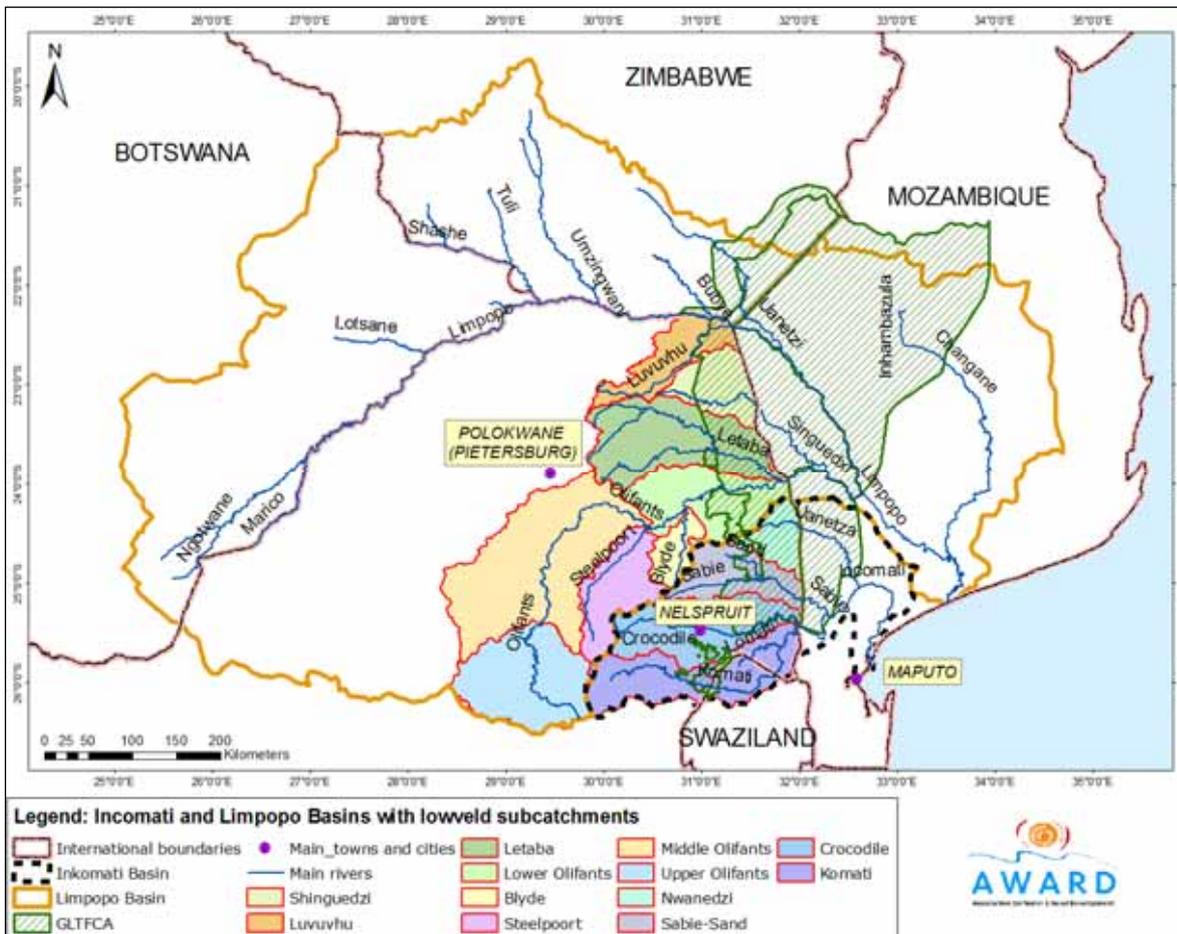


Figure 1: The study area comprises six major rivers of the South African lowveld: the Luvuvhu, Letaba, Olifants, Sabie-Sand, Crocodile and Komati Rivers. In South Africa these rivers and their catchments comprise three Water Management Areas (WMA): the Luvuvhu/ Letaba WMA in the north, the Olifants WMAs in the central region, and the Inkomati WMA, in the south. All six rivers contribute to international watercourses, the Limpopo and Incomati basins

Basic details for each catchment are provided in Table 1. The table also indicates the water availability for each of the catchments. A more detailed breakdown of water use by sector is provided in Pollard and Du Toit (2010) and Pollard et al (2011).

Table 1. Summary of characteristics and water availability for each of the Water Management Areas.

WMA	Population (million) (1995)	Total area Km ²	Catchments	Balance/availability ¹ (Mm ³ /a)
Luvuvhu/Letaba	1.5	17300	Luvuvhu	37
			Letaba	-42
Olifants	2.8	54550	Olifants	-192
Inkomati	1.5	28757	Sabie Sand	-311
			Crocodile	-282
			Komati	-273

Table 1 indicates that all the catchments except the Luvuvhu are in deficit i.e. requirements exceed the availability. It is important to point out that these figures do not take unlawful use into account as they are a

¹ Negative figure indicates deficit

reflection of registered water use only. The deficit situation might therefore be worse in catchments where there are high levels of unlawful use.

This situation points to the need to manage these rivers within the context of ‘deficit’ as outlined by Movik (2010). In the short term, the Department of Water Affairs (DWA) policy has been not to issue any more water use licences to the major user, irrigation. Further development of water infrastructure seems unlikely as the surface water resources are extensively developed with a large number of small to major dams in all catchments. Taken together this means that more sustainable management options are now crucial for securing water for the future and that instruments such as the Reserve are potentially fundamental to the management process.

Compliance with the Reserve

Although the Ecological Reserve is not yet determined for every river in the country, all the rivers in the lowveld have either a comprehensive or preliminary Reserve determined (Pollard et al 2010). There is therefore adequate data to complete a preliminary study to determine trends towards or away from compliance using Instream Flow Requirement (IFR) data (Pollard et al 2011). A summary of the findings of the abovementioned study are provided Figure 2 giving an indication of the trends for each of the catchments.

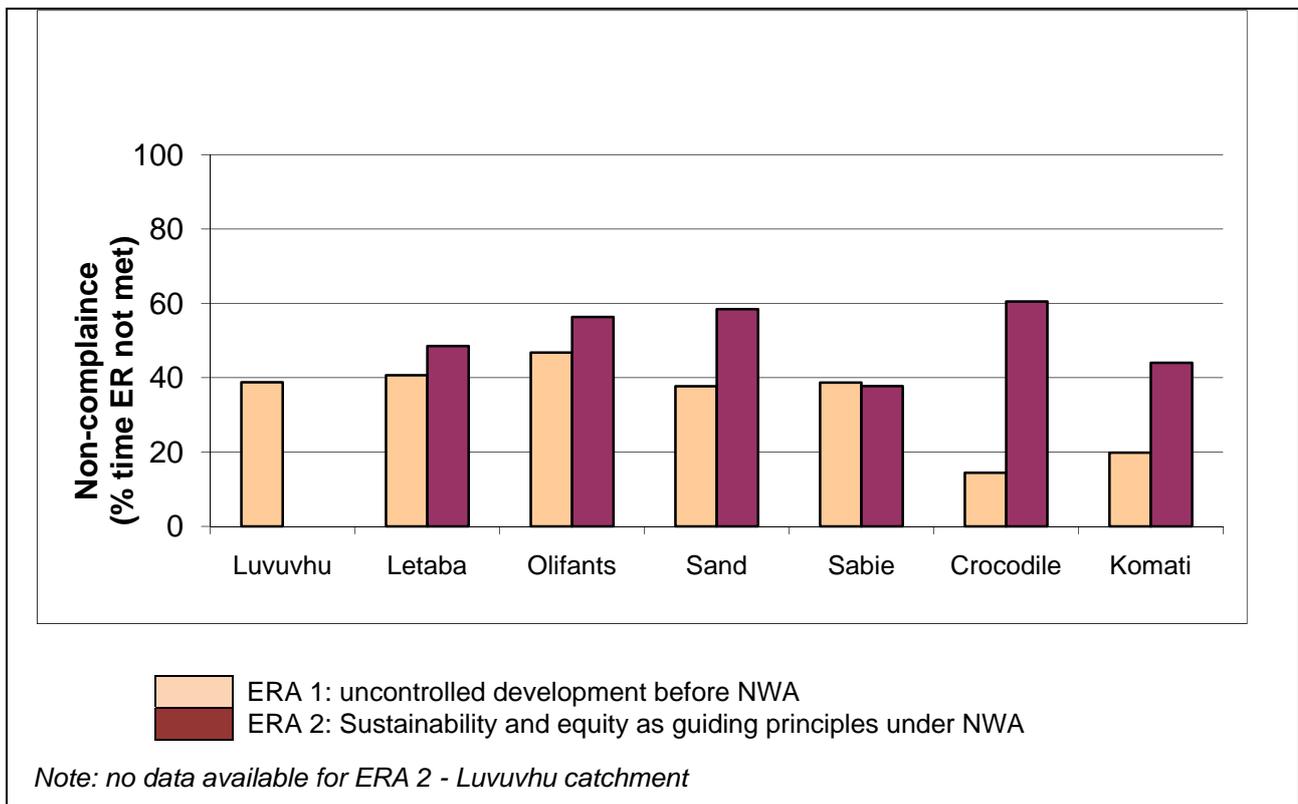


Figure 2. Non-compliance with the Ecological Reserve pre-and post policy changes or management intervention

Figure 2 confirms that there is a trend towards deterioration of the rivers of the lowveld in terms of quantity of flow over two time periods for all rivers except the Sabie. The time periods under analysis in this study (Pollard et al 2011) are divided into two: the period prior to the promulgation of the NWA and the period after the promulgation of the NWA. In this way we see if the NWA has had any impact on the status of river flows in the lowveld. The available data indicates that there is a increase in the percentage of time that the Ecological Reserve is not met despite the promulgation of the NWA although the study maintains that there is evidence to suggest that the compliance situation is improving for the rivers of the Inkomati WMA and the authors suggest that this could be due to the establishment of the Inkomati CMA. The general decrease in

compliance over the years form the basic context for the discussion that follows. More detail on issues of non-compliance are dealt with in Pollard and Du Toit (2011).

FINDINGS AND DISCUSSION

In this section we present three key findings. The issue of feedback loops and adaptive management is covered in a paper by Pollard and Du Toit (this Convention). The first and most fundamental finding in relation to this paper is that there is poor understanding of 'tools' such as the Reserve that focus on the practicalities of achieving sustainability, secondly, despite the basin authority taking some responsibility for the Reserve, no institution holds the development of a sustainability discourse for water resources management in the region and thirdly, learning through review and reflection at a collective level is very rudimentary in all catchments with adaptive water management not being taken up for purposes of management.

Despite interviewees raising concerns regarding the status of the resource on almost every occasion, it appears that managers and water users have not taken advantage of the water resource protection measures offered by the National Water Act (NWA). To a large degree Integrated Water Resource Management (IWRM) and catchment scale planning have not yet become part of the management language used by regional management and water users (Pollard and Du Toit, 2011). For the most, concerns were fragmented and divorced from new management approaches provided for by the NWA. Knowledge and familiarity with the tools such as the Reserve, Resource Classification and Resource Quality Objectives varied considerably in all WMAs. In the Luvuvhu/ Letaba WMA, for example, almost all interviewees had either not heard of the water resources protection tools or if they had, did not regard them as an important long term priority for the catchment.

From a sustainability point of view it is troubling that 17 years after promulgation no discourse on sustainability is emerging in the water sector. The adoption of IWRM has demanded that water practitioners and civil society accept new priorities for water management and use. However, this study showed that at almost every level of the water sector and civil society there is conceptual conflation and a basic lack of clarity as to what the policy and legislation mean by sustainability (Du Toit 2005, Biggs & Du Toit 2008). The apportionment of the responsibility for the water resources protection to specific parties, mainly the national DWA was pervasive through all catchments. This points towards the conceptualisation that the stakeholders and regional officials do not see responsibilities for sustainability planning to be their own and ultimately that there is still a strong reliance on centralised national government to take charge of such affairs. This conflicts with the intention of the NWA to promote and sustain more decentralised and democratised approaches to water resources management. The 'othering' of issues of sustainability is not unique to South Africa and remains a global challenge for sustainability discourses (Ison et al., 2004).

Although the Reserve is only one tool in a bundle of water management strategies designed to achieve sustainability in South Africa, it has the highest profile as a means to achieve resource protection yet there is very little familiarity with it. Figures 3 a, b & c provide us with a visual representation of what respondents believe they know about the concept of the Reserve for each of the 3 WMAs. Responses were categorised into three groups: "don't know", "some understanding" and "well understood". A comparison of the three graphs show that nearly half the respondents in the Luvuvhu/Letaba did not know about the Reserve while that decreased to 30% in the other two WMAs. In the Luvuvhu/Letaba around 40% claimed to have some understanding whilst that category increased to 50% and 55% in the Olifants and Inkomati WMAs respectively. Between 15 – 20% of respondents believe that they have a good understanding of the Reserve.

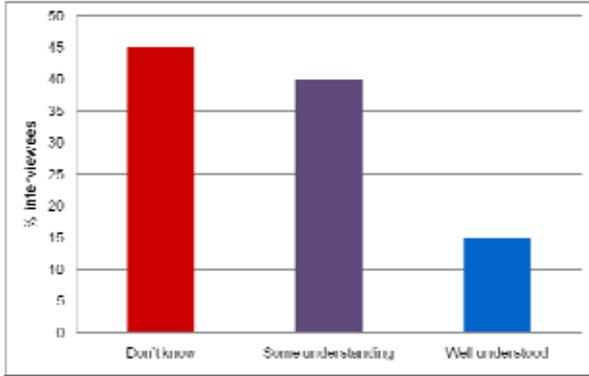


Figure 3 a: Knowledge of the Reserve in the Luvuvhu/ Letaba WMA based on interviews

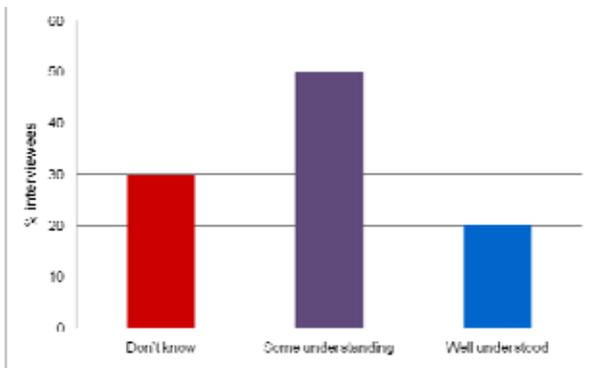


Figure 3 b: Knowledge of the Reserve in the Olifants WMA based on interviews

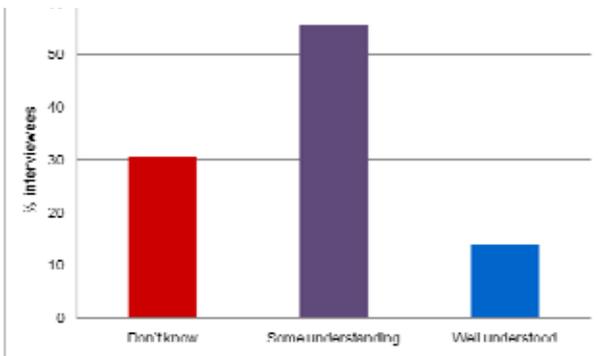


Figure 3 c: Knowledge of the Reserve in the Inkomati WMA based on interviews

How the Reserve is experienced on the ground has become a particular interest (Biggs & Du Toit 2008) showing that various stakeholder groups have their own conceptualisations of what sustainable water resources management entails. Especially evident are the differences between the water supply sector on the one hand, and the water resources planning and protection, on the other. Earlier reports (Biggs & Du Toit 2008, Pollard and du Toit 2008) describe how different sectors hold different understanding and priorities for water resources management. The authors report that these understandings are carried over sectorally into daily language and practice. This is reflected in the different ways that the concept of sustainable management is applied and the meanings that are held for the Reserve.

One of the most striking findings is that the national custodian and regulator had, at the time of the research, a generally poor understanding of the Ecological Reserve. This is despite its articulation in the NWA some 13 years previously. This raises concerns for implementation since they are tasked (together with National DWA) with regulation, enforcement and compliance of the NWA including the Ecological Reserve. In terms of users, one WUA, comprising experienced managers, recognised the Reserve as a legal requirement but not as a tool to ensure long term sustainability. In the case of another, the view expressed was that it was a “waste of water”, undermining agriculture - “the Reserve will kill agriculture”, and “just a lot of rules and regulations”. In the case of resource poor farmers, knowledge of the Reserve was almost non-existent. The water services managers in local government had vaguely heard of the Reserve but felt it was not of any particular concern to them.

We have noted that role of the individual in carrying practice forward should not be overlooked. As evidenced in the Inkomati the water resources manager of the ICMA and some of his staff are well versed with the concept, as is the director of WRM at the DWA regional office. At the ICMA in particular, knowledge and commitment to the Reserve is high. Efforts are being made to incorporate Environmental Water Requirements (EWRs) in planning and operational procedures in the Crocodile and Komati rivers. A ‘real-time’ monitoring system that is being developed (discussed in Pollard et al 2011, Pollard and Du Toit 2011). We submit here that although the role of individuals is important in furthering sustainable practices they cannot be held responsible for developing a sustainability discourse alone. This is the role of institutions and we maintain that an institution is needed to hold such a discourse so that the management priorities and goals can be formally set, monitoring in that regard can be exacted and compliance enforcement can be carried out.

Stressed or over allocated catchments present a major challenge for the emergence of a sustainability discourse as it needs to moderate sector interests and resist powerful market forces. Without the principles of sustainability being held and understood broadly, in other words by the user-collective and management institutions. Without priorities being set by a designated institution there is the likelihood that they will remain an unrealised policy statement. Whilst some institutions such as the Inkomati Catchment Management Agency (ICMA) feel legally obliged to implement the Reserve it appears that no institution feels responsibility for holding or articulating a sustainability discourse for catchment-level water management.

The question is: where can a sustainability discourse be held? The research showed that knowledge of the Reserve was higher in WMAs where multisectoral basin management institutions (Catchment Management Agencies) and active multiple stakeholder platforms (Catchment Management Forums) exist. This suggests that the emergence of a sustainability discourse is more likely to occur where issues pertinent to the entire catchment or basin can be raised with all affected parties. It appears that such issues are not raised within sector-specific institutions or within single sector forums. Pollard et al (2011) maintain that there is evidence to suggest that compliance with the Reserve is improving in those catchments where there are active CMAs involved and who take sustainable management as their mandate. Support is therefore needed for multi-sectoral management bodies if more sustainable options for water management are to emerge at catchment levels.

A number of different platforms do exist throughout the WMAs although less prevalent in the certain catchments like the Luvuvhu and Sand River catchments. Some of these enjoy the support of multiple sectors (e.g. Crocodile and Olifants River Forums). In many cases however localized platforms often reflect single-sector interests, or focus on specific sections of the river such as in the case of the WUAs or Irrigation Boards. The latter still tend to represent only commercial agriculture. It is worth noting here that interviewees reported that the catchment forums are the key source of knowledge on IWRM and presumably also the Reserve. On the other hand, some felt that that forums as plagued by “inaction” and the lack of a common goal. In such cases the movement from ‘forums for information sharing’ to ‘forums for action’ is clearly a challenge.

Whilst multiple stakeholder platforms are an opportunity for the evolution of collective action (Gray 1985) we believe the potential is being lost. As far as sustainability goes, the lack of consensus around future priorities is a threat to achieving it. Even with the well established Crocodile Catchment Forum, the concept of

sustainability appears to be currently missing from the agenda. Despite the forum, communication and relationships between different sectors were noted as weak. The lack of responsiveness, feedback and communication is identified as an obstacle to collaboration in the catchment. Relationships with the regulator were singled out as particularly problematic. The industrial sector claims that DWA is unreasonable and uncommunicative: “we need a sympathetic ear in order to move forward”.

As pointed out earlier, one of the main issues bedevilling sustainability in the lowveld rivers is that of a poor ‘understanding’ of the Reserve. But understanding will not happen without learning. Leading to a situation where river systems are degrading despite the presence of legislation and sustainability tools. The main question arises as to how stakeholders learn about sustainability and the new orientation to water management. From this work it is evident that there is almost no professional network for addressing sustainability and the implementation of the Reserve meaning that adequate learning is not taking place. Nonetheless the seeds of professional networking and learning are seen in multi-sectoral collectives such as the Co-ordinating Committee for Agricultural Water (CCAW) raising the priority for sustainability planning within the agriculture sector and the Crocodile Operations Forum addressing river flows.

The role and status of learning in adaptive water management, is another key area to emerge from this scoping work. The resilience, and hence sustainability of a system, is not an individual property, but a property that is held by the whole. One would assume that a vulnerable (unsustainable) system would have weak networks where there is no learning from reflection. Learning is critical for coping with change but what role does play in moving catchments towards more resilient, stable and sustainable states? and what are its benefits and consequences for the system as a whole? The guidelines for developing Catchment Management Strategies (DWA 2007) has embraced the notion of Strategic Adaptive Management and calls for formal review every five years in order to support learning for action (Pollard and Du Toit 2008). It is however too early to comment on the process as the first CMS has only recently been approved. But the need for formal reflexive action at the level of the catchments is likely to be new with the demands for the development of learning organisations (Senge 1980, Argyris and Schön 1978) being high on the agenda. Pollard and Du Toit (in press) have already identified an example of how learning is a critical component of functioning feedback loops and self-regulation in one catchment of the lowveld. This case however is an exception.

The pervasive ‘doing-without-reflection’ evident in the case study is a challenge standing in the way of adaptive management becoming institutional practice. Pollard and Du Toit (in press) report how feedback loops and self regulation might provide an important adaptive approach for managing catchments in more sustainable ways. The role of reflection in learning is also being explored in an ongoing research programme. This work builds prominent educational theorists such as Dewey (1933), Habermas (1971), Kolb (1984), and Schön (1987; 1983) who emphasize the importance of reflection as part of a learning process. Although they apply the concept differently they all elaborate on the topic of reflection as increasingly important for addressing problems that do not have obvious solutions. According to Habermas (1971), reflection is essentially a problem-solving or decision-making process. Reflection is a process that *identifies* the problem, *creates* the strategy to solve it and *monitors* progress towards the goal (Moon 1999). A reflective habit is then integral to planning for improved practice and skills development. Without reflection, learning will not happen and without learning adaptive water management cannot exist as a process.

CONCLUSION

In conclusion we are able to reflect on the understanding and commitment to give effect to the Ecological Reserve and hence sustainability in South Africa. Firstly, the presence or absence of sustainability from the discourse of water management is of central concern to the implementation of the Reserve however, evidence of practices where sustainability is at the forefront of planning was rare. Where there is no or little priority for sustainability there is likely to be poor attention to the Reserve. Secondly, if participants in a decentralised resource management setting do not understand what is intended by water resources protection and what it means for them, it may be difficult for them to contribute appropriately.

For sustainability to be embedded in the practices of IWRM, stakeholders must be familiar with the concept, its associated tools and its relevance for them as users. Efforts to make the Reserve a collective benefit and responsibility are essential. Whilst the “oppositionalisation” of the Reserve with economic viability is worrying, this is not unique to South Africa (Ison et al 2004). By assigning benefits to others (such as the conservation sector), responsibilities can also be assigned elsewhere. Transformation towards a shared, catchment-based vision can only be achieved through a collective understanding and approach (common language and discourse). However, future efforts need to move beyond simplistic awareness-raising campaigns which are a naïve response to the needs emerging around implementation of the Reserve. The ‘raising’ of awareness might familiarise stakeholders with the term but do little to support the development of skills and practices that ultimately lead to *competence for sustainable management*. Globally, social learning approaches (Ison 2004; Wals 2007; Muro and Jeffrey 2008) are seen as important for developing a collective understanding and reducing resource related conflicts.

The role of bringing stakeholders together to negotiate the management of limited and limiting resources has been discussed by many authors (Steins and Edwards 1998, GWP 2003, Ison et al 2004, Wals 2007, Warner and Verhallen 2005, Warner 2007). Networking, negotiation and collaborative planning are elements remarkably well-catered for in the NWA (through CMAs, forums, committees and water user associations). Nonetheless, in general collective action towards IWRM is weak and requires attention since, as noted above, transformation is unlikely without a common vision and stakeholder participation. Here the challenge is for stakeholder groups to explore potential options in a supportive environment and dialogue around the opportunities that exist. The intention is to raise levels of collective action for improved and more sustainable water management were collective action and collaborative planning can be defined as “collective process of involving diverse stakeholders for resolving conflicts and advancing shared visions” (Gray, 1985). Furthermore, integral to collective action is the assumption that diverse stakeholder groups perceive the **same** management problem. Our research suggests that this is not the case.

We believe that multiple stakeholder platforms are critical for developing a shared discourse on sustainability across all sectors and for holding adaptive management processes at a catchment level. Without such platforms at which the *status quo* of the resource can be discussed, together with a sustained programme of ongoing learning from management action – sustainability is unlikely.

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