

Integrated water resource management in complex systems: How the catchment management strategies seek to achieve sustainability and equity in water resources in South Africa[#]

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Abstract

It is increasingly evident amongst practitioners and academics alike that the management approaches of the past have failed to deal adequately with the challenges posed by complex and rapidly changing systems. Indeed the call for integrated approaches such as those embodied in integrated water resource management (IWRM) reflects such concerns. This is because these systems are characterised by complexity in which an understanding of linkages, multiple drivers and unpredictable outcomes is critical. It is also widely recognised that the management of such systems requires an iterative, 'learning-by-doing' approach that is reflexive in nature and builds learning into the next management cycle. We suggest that any attempt to define and implement viable and effective governance of water resources, as well as rehabilitation measures, requires understanding that catchments are complex systems showing the aforementioned characteristics. As a corollary, an adaptive management approach appears best suited to such conditions.

In this paper we argue that South Africa's highly-acclaimed National Water Act and associated policy documents such as the National Water Resource Strategy is an example of a policy document that reflects this thinking, as is evident in the guidelines for the development of catchment management strategies which are introduced and described. These offer a framework for the development of a holistic, systems understanding which is strategic and adaptive. In particular, under such a framework, we select the two cornerstones of the Act – sustainability and equity – to explore this theme. We show that under such a framework ensuring that both these principles are achieved is not through one simplistic management action but through an integrated, systems approach. The development of strategies is driven by principles which help one to navigate issues that emerge in complex systems in a flexible way. Visioning and scenarios offer important management tools for establishing a hierarchy of actions that can achieve the overarching principles and that can accommodate change. In complex systems, the users must be part of deriving management solutions since this is where and how they learn. Self-organisation, identity and embeddedness are all essential characteristics of building resilience in a catchment system.

Keywords: complex systems, integrated water resource management, catchment management strategies, sustainability, equity

Introduction

South Africa's highly-acclaimed National Water Act (Act 36 of 1998) provides the foundation 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; DWAF 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 (RSA 1998). These principles are strongly transformative in nature, seeking to move towards integration, redistribution and equity in allocation, sustainable use, resource protection and participation (see preamble). Moreover, the importance of international needs is also recognised. Equally ground-breaking in nature, the Water Services Act (Act 108 of 1997) which provides for the rights to basic water supply and sanitation,

recognises that although the provision of water and sanitation services is an activity distinct from the overall management of water resources, it 'must be undertaken in a manner consistent with the broader goals of water resource management'. These are provided for by the National Water Act.

Central to the re-orientation embodied in the National Water Act (henceforth referred to as the Act) is the concept of integrated water resource management (IWRM). In this regard, the Act explicitly recognises 'the need for the integrated management of all aspects of water resources'. The Department of Water Affairs & Forestry (DWAF 2003a) defines IWRM 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' (see also GWP 2002, Jones et al. 2006). In its entirety IWRM 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 (DWAF, 2004 a). It also draws on a *rights* discourse (see Box 1). Another fundamental change that accompanied the policy overhaul was the management of water resources on a catchment basis. Indeed the Act notes that the National Water resource Strategy (NWRS) must provide the framework within which water will be managed at regional or catchment level, in defined water management areas.

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