Water Resource Planning Systems Series

SUB-SERIES NO. WQP 1.7.1

Resource Directed Management of Water Quality

MANAGEMENT INSTRUMENTS

Volume 4.1

Guideline for Catchment Visioning for the Resource Directed Management of Water Quality

August 2006

Edition 2

water & forestry

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Water Affairs & Forestry
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DEPARTMENT OF WATER AFFAIRS AND FORESTRY

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1.2	*National and International Literature Survey and Contextual Review
1.3	Appendix E: Project Document. Glossary of terminology often used in the Resource Directed Management of Water Quality
1.4	Volume 1: *Policy Document Series*
1.4.1	Volume 1.1: Summary Policy
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1.7.6	Introduction

Bold type indicates this report.

*These reports are internal project management documents that are not available for publication.
**These reports are earlier versions that have been improved upon in the second edition and thus are not available for publication.
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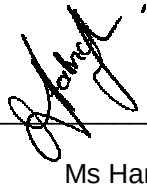

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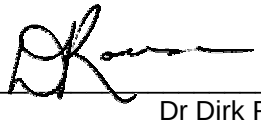

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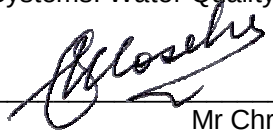

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EXECUTIVE SUMMARY

In many ways, natural resource sharing and management are reflective of the complexities, challenges and opportunities in contemporary South African society. In many cases, supplies of natural resources cannot be augmented or replaced as fast as they are used and society is under pressure to share them equitably and democratically. Tough decisions must be made because the costs and benefits of resource use must be reconciled in an equitable way. Further complexity is added through the changing nature of ecosystems, and as societal contexts and values shift over time. Thus, the sharing and reconciliations are never static, but an ever-moving target. Urgent and compelling development and economic growth needs must be balanced with the equally important need to protect the natural resources that provide the life support systems for society. Through these challenging deliberations, natural resource management becomes an important vehicle for nation building through participation, value-sharing, development of new shared understandings, improved tolerance, and co-operation. But these processes and changes cannot happen on their own. Society's diverse needs, preferences and values have to be aligned continually towards a common vision for the future.

This guideline provides the underpinning rationale and a process for developing a catchment-level vision. It also provides a structured process that should be used to disaggregate the vision to objectives, and which is designed to promote accountability in both management and the public who participate in the process. The management instrument takes account of the fact that public participation processes range from non-existent to robust and vibrant across the country, and therefore makes provision for setting up a catchment vision and management objectives regardless of the state of maturity of public engagement processes.

The tool focuses on the social process of sourcing shared values and bringing them into the same arena to develop a shared vision for the future. The dynamic social process (with technical and scientific support) is the one which can generate voluntary co-operation and support for the vision as well as the management objectives that flow from it.

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ACRONYMS

CAS	Catchment Assessment Study
CMAs	Catchment Management Agencies
DWAF	Department of Water Affairs & Forestry
IDP	Integrated Development Plan
IWRM	Integrated Water Resource Management
NWA (36:1998)	National Water Act
RDMs	Resource Directed Measures
RDMWQ	Resource Directed Management of Water Quality
RQOs	Resource Quality Objectives
RWQOs	Resource Water Quality Objectives
SEA	Strategic Environmental Assessment
WMA	Water Management Area

SECTION 1: INTRODUCTION

1.1 A 'vision' and 'visioning'

Visioning is a future-building process

It is widely acknowledged that a fundamental objective of integrated water resource management (IWRM) is to ensure that resource-based costs and benefits are appropriately distributed in society (Van Wyk *et al*., 2006a). Because of past inequities, there will be much emphasis on redistribution of benefits. A first step in this redistribution is to align the diverse and competing interests in the resource (where 'resource' refers to the entire aquatic ecosystem, not only the water component), and then to direct them towards achieving a collective desired future. Visioning is a process of articulating society's aspirations for the future – in this case, the 'basket' of benefits to be derived from aquatic ecosystem services and the costs associated with their use.

The visioning process begins with the generation of a vision statement and ends with the identification of focus areas that allow for the setting of management objectives. A vision statement must be converted into, and explicitly linked with, objectives that are useful at the operational level. Unless a vision is linked clearly to practical end-points (i.e. explicit objectives for management), it will not be supported by those who are involved in the water allocation and licensing process. Promoting these objectives will move society towards the attainment of the vision.

Balancing the costs and benefits of resource use must include both resource quality and quantity components. In this way, both are incorporated into the formulation of a statement of the desired future conditions of resource use and protection.

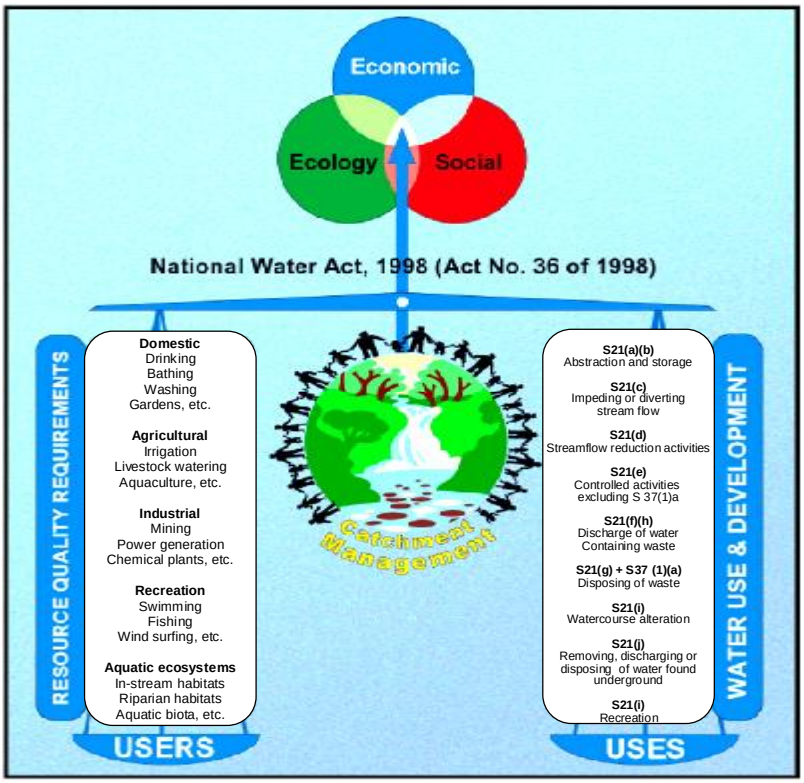
Aquatic ecosystems support human well-being

River ecosystem goods and services sustain human life by supporting basic human needs, social well-being and economic growth and development. Benefits include tangible products such as water, food, forage, building and craft material (e.g. timber, sand and reeds), natural pharmaceuticals and industrial products and their precursors. The harvest and trade of these goods represent an important and familiar part of the human economy. Ecosystem services include a range of processes that support human well-being, for example the maintenance of water quality through filtration and waste disposal, as well as benefits relating to recreational and spiritual needs. When people think of their future relationship with the water resource, they tend to think of it in terms of the goods and services they might benefit from, or those that are needed but may not be available to them.

People derive benefit from both on-site and off-site use of river ecosystem goods and services. For example they may engage in on-site consumptive processes such as watering and grazing livestock and harvesting animal and vegetable products. They may also engage in non-consumptive on-site activities, including recreation and religious ceremonies. Others, some of whom may never access rivers directly, derive benefit from off-site use of the resource. These include benefits accruing to people who use water abstracted from the rivers and aquifers to service domestic and industrial needs at remote locations.

Some of the off-site uses may be consumptive such as abstraction of water for irrigated agriculture, while others - such as waste disposal - may to a large extent be non-consumptive. Those who have direct association with rivers for enjoyment or survival tend to hold greater awareness of the diversity and value of ecosystem goods and services than those who depend on goods and services at locations remote from rivers, such as in urban environments. Both of these groups are linked to river ecosystems, but their awareness of the linkages is often quite different (Van Wyk *et al*., 2006a). This point has an important bearing on the visioning process, since these different levels of awareness of the 'basket' of water resource uses in a catchment will pose a challenge to aligning a catchment community's aspirations towards a common vision.

Several factors influence the nature of the relationship between people and the water resource over time. One is that the resource itself is variable over space and time, for example droughts and seasonal fluctuations in the supply of goods and services. Also, user needs may change in space and time. Perhaps a town expands and requires more domestic water, or a crop loses market value and the farmer chooses to convert to another crop that may use more or less water. Or a water-conservation technology such as drip-irrigation becomes available, which changes perhaps the magnitude and patterns of water use. These examples illustrate the dynamic nature of the factors that influence the condition of the resource. One of the functions of the visioning process (and public participation as part of the visioning process) is to bring this variation in the resource and dynamic changes in user needs (See Schematic 1) into the process of setting the desired future condition.



Schematic 1: Use and user needs, plus the state of the resource, are dynamic over space and time. The visioning process creates a space in which this dynamic variability can be aligned towards an agreed future. (Extract from Van Wyk *et al*., 2003)

The resource is more than water

In setting a vision it is important to understand how the law expects us to interpret 'the water resource', for which a vision is developed. The law acknowledges that the entire aquatic ecosystem, thus not only water, is a life support system. The 'water resource' is thus defined to include a watercourse, surface water, estuary or aquifer, on the understanding that a watercourse includes rivers and springs, the channels in which water flows regularly or intermittently, wetlands, lakes and dams into or from which water flows, and where relevant the bed and banks of the system. The quality of the resource (the 'resource' being the ecosystem providing services beneficial to people) is also defined broadly to include fluxes in flow; physical, chemical and biological characteristics of the water; the character and condition of the in-stream and riparian habitat; and composition, condition and distribution of the aquatic biota. The resource was thus seen by drafters of the law in a holistic sense, to include (1) the water, and (2) the ecosystem of which it is a part and through which it flows. It also recognises the diverse influences exerted by the quality and quantity of water on the ecological processes, which in turn regulate or direct the functioning of the resource.

Visioning promotes voluntary compliance

The visioning process must generate a dialogue that promotes ongoing shared awareness and understanding amongst resource users - of each others' diverse, dynamic and often competing water resource-related needs. A properly conducted visioning process will encourage people to adjust their individual demands on the resource in the broader interests of sustainability and co-operative management. People are more likely to support resource-related decisions (and processes) voluntarily if the visioning process promotes equity and shared understanding of the costs and benefits of different resource use options. It will be critical to foster a process that promotes the co-operative design of rules for water resource sharing and the voluntary compliance (i.e. self-regulation) to such rules. The alternative is a likely reversion to more centralised government regulation and policing process to ensure that the rules of water resource use are complied with.

1.2 Intent of the visioning process

Vision promotes accountable decision-making

The specific intent of catchment visioning is:

- To generate a sense of cohesion and common purpose amongst people with diverse interests in the water resource.
- To direct activities related to diverse interests towards that common purpose.
- To continuously improve water resource management practices and the state of the resource.
- To promote a culture of co-operation and consensus-building.
- To provide a chain of accountability that links the vision to management objectives and management actions, so that it is possible to track whether or not the actions contribute to achieving the overall vision.
- To provide clusters of objectives that allow operational managers to interpret licence applications and to formulate and recommend license conditions in a strategic fashion.

1.3 Purpose of this document

Public participation is an important part of designing a vision

This guideline describes a practical process for developing a catchment-level vision and for disaggregating this vision into component management objectives.

This process should ideally be conducted with the involvement of and input from, all interested parties. However, building inclusive participatory processes into natural resources management takes time, and is a new experience for South Africa. Resource managers currently find themselves in a transitional phase in terms of putting in place processes that underpin inclusive and transparent public engagement.

Visioning can be useful in the absence of full public participation

A number of instruments and guidelines are available to guide visioning and public participation for natural resource management in South Africa (e.g. Rogers and Bestbier, 1997; Carl Bro Int., 2001; DWAF, 2001; Motteux, 2001; Anderson, 2002 and Van Wilgen *et al*., 2003), but none have been fully implemented. A number of these processes may be legitimate, but only one is presented here in detail.

Water resource managers have relatively little experience in engaging the public in the resource management process and civil society is in many cases ill-prepared to participate in such processes. Water resource managers drive the resource management process within an environment of radical institutional change (restructuring in DWAF, the establishment of Catchment Management Agencies and related statutory and non-statutory organisations).

Bringing the public into a participatory process in this environment and sustaining the energy of the process can be complex, time-consuming and frustrating. In the meantime, resource allocation (and the resulting authorisation of water use) and resource use must continue. Resource-based businesses and livelihoods cannot wait for the "perfect" public participation process to be in place. The visioning process outlined here provides regional DWAF officials with a tool to articulate, relatively quickly, a desired future state on behalf of the catchment community and other interested parties, in order to set the adaptive management process in motion. The consequence of this is that, initially, there will most likely be little stakeholder buy-in to either the vision or the process of achieving it.

Regional staff will have to engage in a continuous process to incorporate an ever-increasing number of stakeholders and their views, and to facilitate vision-building so that the process is supported. This does not imply that the interim process should be regarded lightly. It must set a robust precedent and platform for subsequent, more inclusive stakeholder participation.

Visioning tool components

Visioning has three major components:

- A step-wise method to generate a vision.
- A method for translating the vision into objectives that drive operational management, and.
- An approach whereby the Regional Office or a CMAs can mobilise stakeholders over time to participate more intensively in the catchment visioning process.

1.4 Outcomes of a catchment visioning process

Visioning results in an objectives hierarchy that links management action to the vision.

The outcome of a catchment visioning process is a vision for the desired future condition of the resource and an 'objectives hierarchy'. The objectives hierarchy begins at its coarsest level with the vision and ends in a series of management objectives of increasing focus, rigour and practical achievability. The desired future state is set through the integration of diverse values, which can be categorised as social values, technical values, ecological values, and economic and political values.

Objectives in the hierarchy relate to both the management of the water resource (biophysical objectives) and to the institutional adjustments required to support more efficient and effective water resource management (Figure 1.1). The higher level vision and objectives serve upper management levels with statements of strategic intent, while the lower level objectives provide on-the-ground operational objectives that can be linked to specific targets with spatial and temporal limits. The lower level objectives represent the most detailed and most technical level of objectives. These are of particular interest to operational resource managers because these objectives inform the monitoring component of the resource management system.

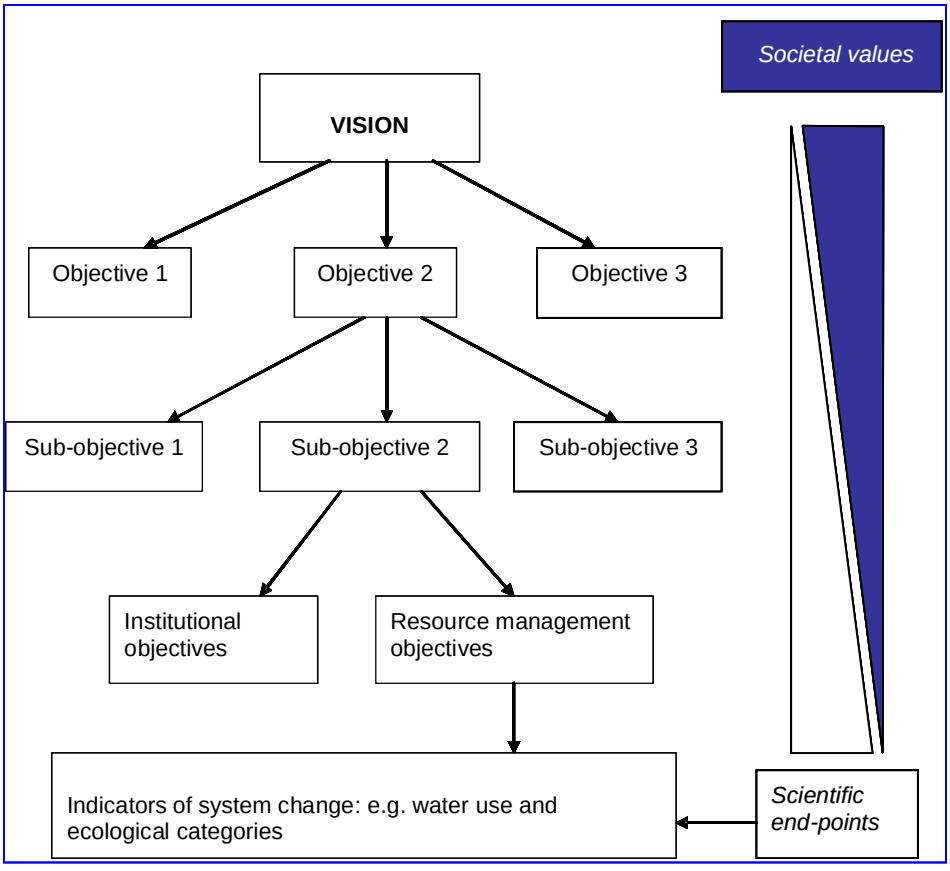


Figure 1.1: The objectives hierarchy process starts with the statement representing the desired future state (a societal / values-based statement) which is converted to scientific/technical endpoints. The technical endpoints are useful at the level of operational management but also link back to the vision explicitly through the objectives hierarchy

Objectives explicitly linked to the vision

Near the higher level, objectives are more value-based, broad statements of society's aspirations for their relationship with the water resource. They are less technical in nature and cater for clusters of water resource users and functions. Towards the more detailed end of the hierarchy, the objectives are more technical and specific, but they can be related back explicitly to higher level objectives (Figure 1.2) to ensure accountability.

Objectives hierarchy and licensing

Figures 1.1 and 1.2 indicate that an objectives hierarchy provides higher level objective clusters that are able to clearly present the aspirations of broad, user, or interest groups. These will be convenient user clusters (e.g. irrigation agriculture and forestry) according to which allocation and licensing can be grouped and managed. At the more detailed level of the hierarchy, the finer-level objectives produce clusters that relate more to within-sector licence conditions at quite a fine geographic scale, for example at the scale of a river reach.

This is an especially useful feature of the objectives hierarchy because it allows the regional or operational manager to issue licences and decide on licence conditions within a broader strategic framework. In other words, it helps to prevent dealing with each licence as an isolated application by placing it within a broader picture of what is required to achieve the overall vision for any given catchment. To use an example from Figure 1.2, a resource manager may receive a water use application for consumptive use. The framework (Figure 1.2) helps the manager to place that application, according to its nature and magnitude, within the vision for consumptive use for that catchment. It also helps the manager to interpret the application in relation to how it might affect the objectives for non-consumptive use and resource protection.

Societal values and management objectives are linked

Figure 1.2 is a more detailed version of Figure 1.1. It shows that the process of vision disaggregation provides a direct link between the values in society (encapsulated by the vision statement and higher level objectives), higher level management objectives (suited to for example, strategic decisions at national and/or regional/WMA level), and lower level operational objectives. Not everyone need be involved in the entire process or at all levels. Higher level management and society representatives might want to be part of the top part of the process, below which the details can become very technical. From this point 'downwards', scientific/technical and operational-level management input is more appropriate. Even though different groups might provide more or less input at various stages of the process, the way it is structured and documented remains transparent and open for debate, contestation and request for accountable justification at any time.

Importantly, the visioning process should not be conducted to deliver water quality objectives alone. Instead, the process should deliver a vision and objectives as they relate to the whole water resource. Objectives that relate to water quality only will emerge as a subset of objectives that are nested within a wider resource management objectives framework. This approach gives effect to the underpinning philosophy that we should not manage water quality, or even water, in isolation, but rather the aquatic ecosystem in its widest possible sense, as required by the National Water Act (see Van Wyk *et al*., 2006a).

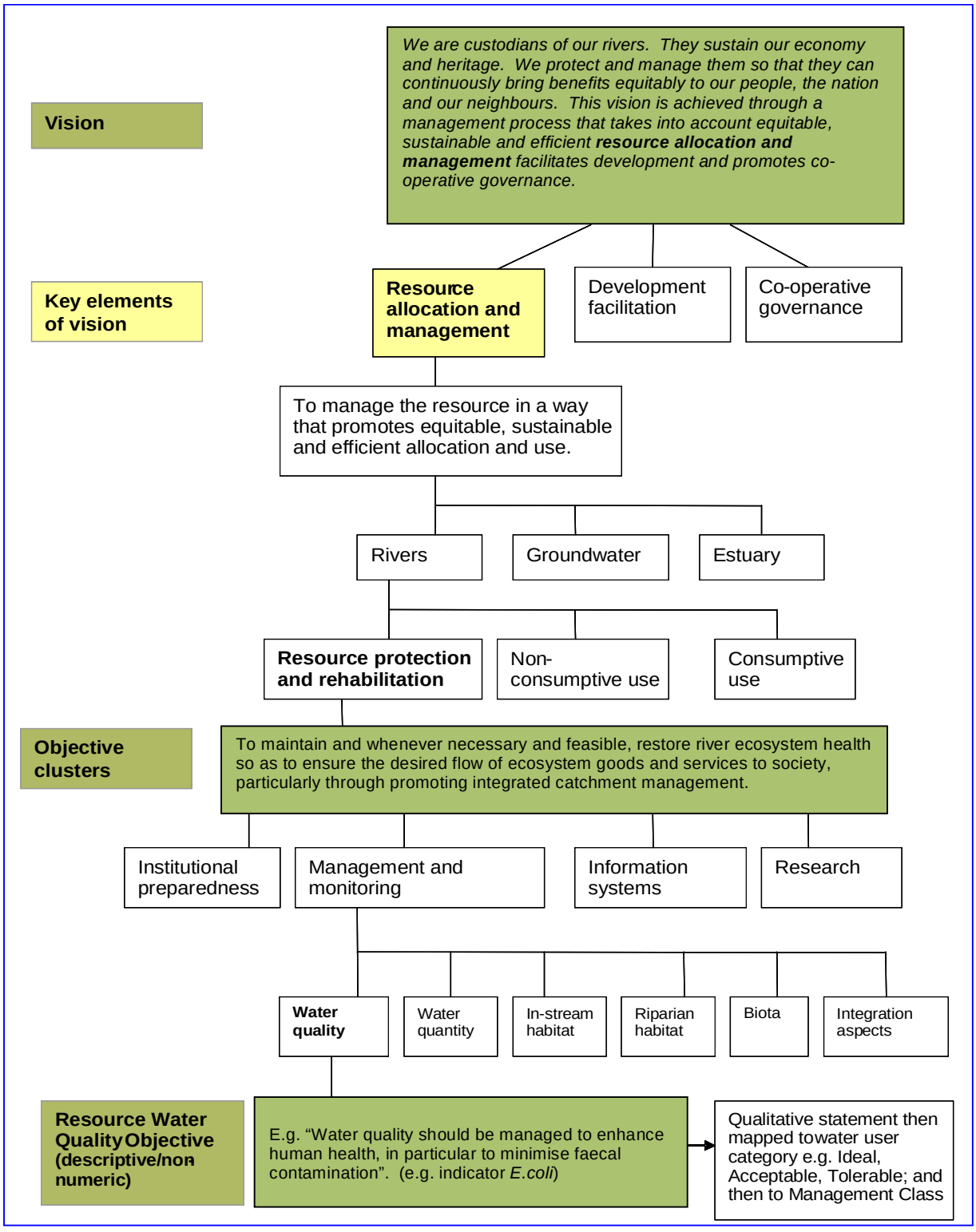


Figure 1.2: An example of a vision statement and its partial breakdown into an objectives hierarchy (adapted from Van Wilgen *et al.*, 2003)

SECTION 2: VISIONING AND THE RESOURCE MANAGEMENT PROCESS

2.1 Catchment visioning and adaptive water resource management

Visioning drives the management process

New legislation makes provision for the use of an adaptive management process (Figure 2.1) to achieve the vision. Visioning sets this process into motion and provides a means of continuously cross-checking day-to-day operational decisions and actions against the vision and higher level objectives.

Visioning is not scenario planning

Note that scenario generation can help to inform the construction of a realistic vision, but should not be used as the primary process to derive a vision. Scenario planning attempts to predict a number of possible future options and encourages a choice between them. The 'designing the future' approach is more conducive to capturing aspirations and encouraging creative solutions from the water users themselves. The person constructing the scenarios (probably a technical specialist) has much control over the outcomes or options. Vision-building is based on a premise of articulating and integrating diverse values. Scenario-planning does not necessarily cater for inclusive value acknowledgement and integration. Inherent in this is the risk of low levels of stakeholder buy-in (i.e. overall poor support for the process) or buy-in by select groups whose interests happen to be captured by one or more scenario.

Adaptive management as an integrating framework

The adaptive management process is also useful in illustrating how instruments and products tie together, and reveals when and where they are used in relation to the catchment vision. For example, Catchment Assessment Studies will primarily be used to inform the 'current state' component in Figure 2.1. The vision (aided by possible scenarios for the future and their possible intended and unintended consequences) assists in defining a management class for a unit of the resource, the Reserve is, and resource quality objectives are determined to support the class.

Resource water quality objectives (RWQOs) costitute planning objective that specifically apply to the water qyality component of resource quality. The determination of RWQOs is inlfuenced by the socio-economic need to utilise the capacity of the said water resource in order to ensure a healthy functioning aquatic ecosystem together with water that is fit for use by the recognised water user sectors.

Apart from providing the basis for the water quality input, once determined, to the formal resource quality objectives (RQOs) detemination process, RWQOs are a pre-requisite when planning for water quality. The determination of RWQOs provides the basis for conducting water quality reconciliation, water quality allocations, benchmarking during water quality foresight, and the detemination of water quality stress. In addition, RWQOs also allow for meaningful water quality scenario analysis and stratetgy establishment; the above-mentioned all being central to water quality planning.

llocations are made within the framework of the set objectives, while license conditions can then be formulated and licenses issued. These management actions lead to changes and the key variables representing change (for both use and the state of the resource) are monitored. The monitoring results drive perceptions of change (and its likely 'acceptability' to water users) and this in turn influences how we describe the 'new' current state.

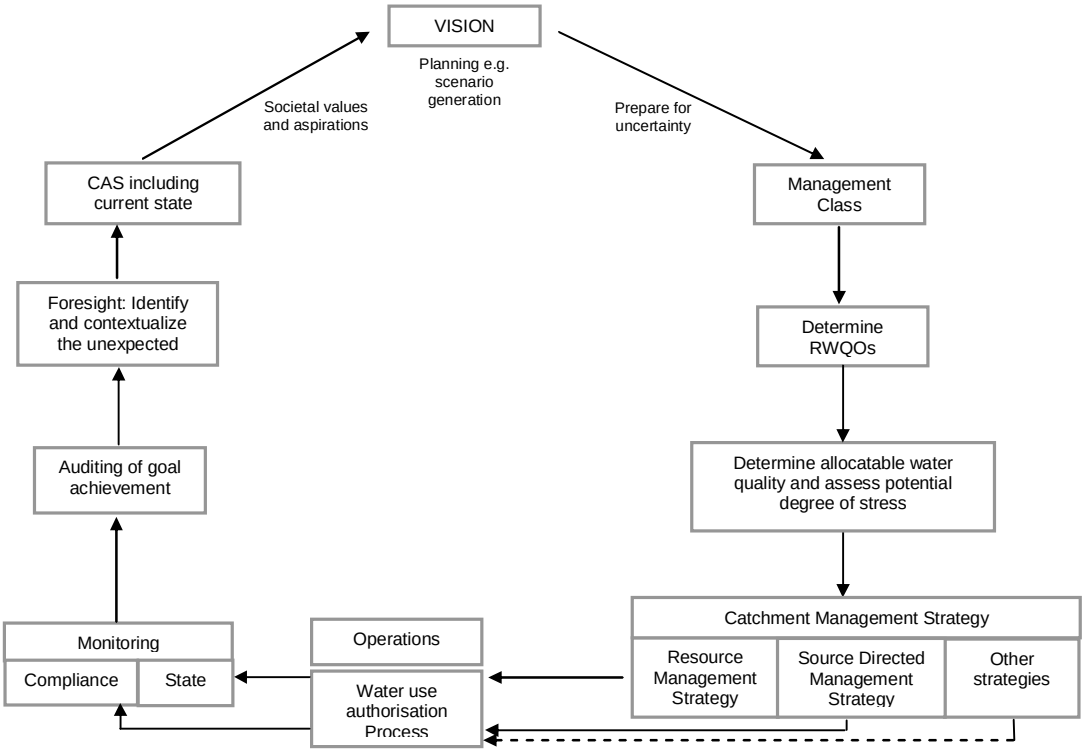


Figure 2.1: The vision relative to the whole strategic adaptive water resource management process

SECTION 3: RATIONALE FOR CATCHMENT VISIONING

3.1 Why have a catchment vision?

What is the importance of a catchment vision to water resources management in South Africa? What does national executive policy say about it? Consider the following extracts (Table 3.1) from the National Water Act (Act No. 36 of 1998) and the White Paper on a National Water Policy for South Africa (DWAF, 1997).

Table 3.1: The National Water Act and the White Paper on a National Water Policy for South Africa spell out requirements for devolved, co-operative resource management and consensus-seeking approaches to achieve a common vision

POLICY SOURCE	EXTRACT	MANAGEMENT IMPLICATIONS
NWA (36:1998) section 27	'water allocation must take into account 'the likely effect of the water use to be authorised on the water resource and on other water users;'	Requires consideration of the interdependencies between users and the impacts of their collective use on the resource's ability to sustain that suite of uses.
NWA (36:1998) Part 2 – Introduction	'In the process of developing the strategy, a catchment management agency must seek co-operation and agreement on water-related matters from various stakeholders and interested persons.	Requires co-ordination and communication between interest groups with diverse interests.
NWA (36:1998) Section 9 A (g)	'enable the public to participate in managing the water resources within its water management area'.	Facilitate public participation in a way that promotes consensus-decisions around resource use.
White Paper preceding the NWA (36:1998), principle 23	"Responsibility for the development, apportionment and management of available water resources shall, where possible and appropriate, be delegated to a catchment or regional level in such a manner as to enable interested parties to participate.	Devolved management. Societal participation at all levels required. Many more people and groups involved in decision-making. Needs and preferences expressed at various scales.
White paper preceding the NWA (36:1998), section 6.3.3	"Through a process of consensus-seeking among water users and other stakeholders, the level of protection for a resource will be decided by setting objectives	Consensus approach to negotiation rests on agreement on and commitment to building a common future (Rogers and Bestbier, 1997 and Sherwill and Rogers, in prep).
White Paper preceding the NWA (36:1998) – Integrated management	Integration is required between authorities and organisations, co-operatively within water use sectors, between water and other resources and the organisations and groups responsible for their management and across geographic boundaries.	The integration of diverse interest at various scales implies the need to learn and act in a co-operative manner towards a mutually agreed goal.
RDMs Integrated manual	The NWA (36:1998) makes provision for an adaptive management process and this is reflected in the way that the chapters are arranged. Adaptive management is iterative and requires that learning and experience be incorporated into each following round of management.	The adaptive management cycle relies on a vision, which provides the basis for collective action towards a common ideal (DWAF, 1999).
NWA (36:1998), Part 2 – catchment management strategies	Every catchment management agency must develop a catchment management strategy for the water resources within its water management area.	The requirement for a catchment strategy implies the need for a collective vision, since a strategy assumes movement from a current state to a defined future desired state.

Everyone contributes to resource decisions

Everyone affected by decisions must have the opportunity to influence resource-related decisions, regardless of their position in society. Within the water sector, the shift from centralised to decentralised, participatory management was driven by both growing water resource scarcity and the global and local trend of democratisation, the development of open societies, and the corresponding devolution of decision-making responsibilities.

The policy statements in Table 3.1 plus the South African Constitution (Act No. 108 of 1996), reflect this thinking and promote the paradigm shift by requiring devolved and democratic participatory decision-making with regard to the use and protection of water resources. In addition, the Department of Environmental Affairs and Tourism, through the National Environmental Management Act (Act. No. 107 of 1998) promotes co-operative governance (see Chapter 3), a right to healthy environment, and public participation in the allocation, use and management of the natural resources.

A vision aligns diverse interests

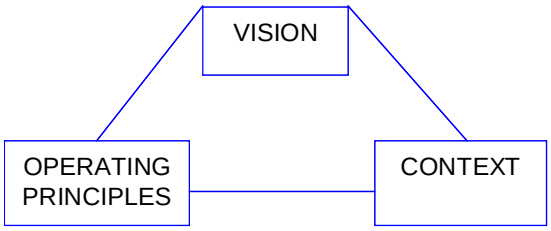
Devolved, demand-side management requires water resource managers to manage diverse interests in, and use of, the resource (i.e. demand) in such a way that the water resource is able to continue providing the desired services (i.e. supply) to society in the long-term. This is a radically different approach to managing aquatic resources from that which is currently practiced.

The vision fosters confidence in the new way of managing the water resource by providing an opportunity for needs and interests to be articulated. The needs and interests are used to construct the vision, which is in turn used as a point of departure and a point of reference throughout the process of adaptive change (MacKay *et al*., 2003).

Managing for the delivery of desired ecosystem services

Demand-side management of a scarce natural resource requires that decisions should be driven by a process that balances societal needs and preferences. Many diverse needs and preferences for our scarce and vital water resources can only be accommodated within a framework of a common vision. The vision is the first step in directing thoughts and action on how the water resource should best be shared. In this way, all types of water resource uses and their impacts are mutually agreed to be acceptable and compatible so that, together, they drive the change process towards achieving the vision.

The change process strives towards attainment of a desired future condition of the resource that reflects a more desirable balance between water resource protection and water resource use. The diagram below shows how context and operating principles can be used to guide the development of a vision. **Context** refers to relevant circumstances, and **operating principles** refers to the values or ethical constraints we use to guide our aspirations. This shows that a realistic vision depends on circumstances and on the values which we choose to guide our actions.



Appropriate time

The diagram also suggests that changes in society (changes in context

frame for a catchment vision

and values) and the rate of change might affect the time frame across which a vision might be stable, but still acceptable. Since the stability of the vision depends on society's operating principles (i.e. 'rules' which are outflows of values) and the context (i.e. circumstances), the vision should be modified whenever principles and context change appreciably. For example, the move to a democratic government in South Africa has changed society's operating principles dramatically so as to achieve equity and sustainability. Thus a new vision for water resource management is important if society wishes to buy into the new operating principles.

A vision must therefore be sensitive to changes in operating principles and changing circumstances, but it should be stable enough to carry a community through one or more adaptive management cycles so that society has sufficient opportunity to do and to learn. It is difficult to put an exact time frame on when visions should change, but they should probably be revisited at least every five years if not more frequently. Ideally, revision of the catchment vision should happen in parrallel with the revision of the Catchment Management Strategy.

The vision, equity and sustainable development.

At the heart of sustainable development lies questions around what is to be sustained, over what temporal and spatial scales, what values (for example equity, efficiency and sustainability) society chooses to balance against one another, and by what process this should be done. This is dealt with in some detail in the Policy on the Resource Directed Management of Water Quality.

The debate on sustainable development has been largely around how to define sustainable development in general and to describe the general goals and biophysical thresholds by which it should be measured (Lele and Norgaard, 1996; Humphrey *et al*., 2002). The issue of the roles of policy and science within this debate has been contentious. This is not surprising, since it has been a popular assumption that scientists and policy-makers are equipped to design generalised statements about what sustainability is at various scales and to make appropriate decisions, on behalf of others, about how the users of natural resources value natural resources at the scale of their use.

In reality, the way people value their natural resources is highly specific to local context and conditions, though often influenced by impacts originating remotely, which means that the process of defining sustainability should be driven by a grounded, bottom-up approach in which society is assited in the process of eliciting and organising values. As Lele and Norgaard (1996, p. 363) put it: "Rather than impose their own perceptions of what should be sustained and for whom, for how long and with what certainty, it would be less destructive for science and more productive for the policy process if scientists allowed these value judgements to emanate from society". The visioning process is precisely designed to give effect to the notion of bottom-up value expression.

Although it is true that some values become less visible in the process of organising and aggregating values for management, the process should at any one time, reflect the perspectives of all those who are to be affected by the decision and its outcomes. This process holds much potential for conflict, since the water resource is in many cases over-utilised. It will for example require the balancing of competing needs and compromises over redistribution.

The vision-setting process strives to promote equity by incorporating all user aspirations for the resource. Visioning promotes equity by fostering good inter-stakeholder relationships and thereby respect, trust and legitimacy of (and therefore continued support for) the process. Once equity is reflected in the representation as well as in how the participatory process is run, stakeholder discussions about values such as optimal use (efficiency), equity and sustainability, and how these should be balanced, will be legitimised.

South African water policy intends for the water resource to be used to advance social and economic development and to do this through an adequate balance between protection and use of the water resource (Sherwill *et al*., 2003). A vision is a consensus-derived statement of intent on how to balance water resource use and protection towards achieving sustainable development.

But, the term 'sustainable development' is too broad to be of practical use in most circumstances. On a practical level, society's needs must be considered, resource limits of supply must be considered and these are dynamic over both space and time. If sustainability means achieving an acceptable balance between resource protection and resource use, then this complexity and variability must be dealt with at the local level first, in our efforts to promote sustainable development.

Our interpretation of sustainable development within the context of integrated water resource management in South Africa has yielded some useful pointers:

- It is the intention of policy that the balance between use and protection must be reached by participation and consensus. Stakeholders tend to think in terms of the benefits and costs of water resource use options to themselves and to their broader community. In other words, they will not think in technical terms such as the Reserve or water resource quality objectives, but rather in terms of goods and services provided by the water resource and the costs and benefits that are associated with those.
- It is useful to view water resource use and water resource protection within the same conceptual framework. The alternative (i.e. the uncoupling of protection and use) leads to a tendency to pitch development against protection, which is clearly not the intention of policy (Van Wyk *et al*., 2006a).

Making sustainability practical through the vioning process

The objectives hierarchy that stems from the vision, provides nodes or areas for detailed discussions around what might constitute an acceptable balance between protection and use.

A discussion around the meaning of sustainable development helps to contextualise sustainable development in terms of water resource use and management. In doing so, it helps us get down to some of the specific requirements (e.g. balancing water resource use and protection) of progressing towards sustainable use and development. It also places emphasis once again on the importance of public consensus around use patterns and use levels and the resource protection that is required to support the agreed upon uses. This approach agrees well with the principles of sustainability as put forward by the Rio Declaration on Environment and Development in 1992, namely equity, futurity, ecological

integrity and participation.

Approval of a vision

Since the vision is an expression of values, it is not something that is 'right' or 'wrong' and therefore does not lend itself to formal approval. However, it can be deemed appropriate, but only by those who stand to gain or lose from it. As custodian of the resource, it will be the task of Department of Water Affairs and Forestry (DWAF) and the CMAs, not to 'approve' or 'sign off' on any one vision, but rather to approve of the quality and legitimacy of the process that underpins its development and implementation.

SECTION 4: CATCHMENT VISIONING AND RDMWQ

A licence must reflect consensus

It is important to ensure that the process of water resource allocation reflects a holistic catchment management philosophy. A holistic and integrated approach is important because the services society derives from aquatic resources are complex and integrated and are not easy to distribute fairly. Interest groups must define and agree on what constitutes an acceptable suite of water allocations given the overall requirement for equity, efficiency and sustainability.

Water allocations and the conditions associated with them (given effect through the authorisation of water use) must reflect society's collective decision about the appropriate level of water resource protection that will lead to the delivery of the desired set of water resource-based services. In other words, water allocations (and use) should give effect to the collective vision. If they do not, then resource protection and use will be disconnected from societal consensus and is therefore without context. In such circumstances, powerful groups will promote their own interests, leading to inequitable use and, in many cases, monopolising and over-utilisation of the services provided by aquatic ecosystems.

A licence is an administrative end-point of a social process

Water use authorisation (which includes licensing) is an administrative process, ultimately approved by the minister, to legitimise resource allocation. Water resource allocation, for reasons explained above, is a social process of ongoing dialogue and the balancing of levels and types of water use, in a constant effort to achieve an equitable, efficient and sustainable distribution of costs and benefits in society. Licence conditions, the resulting resource use patterns and the resulting state of the resource, must therefore collectively reflect the catchment stakeholders' consensus-decisions around allocation. However, these perspectives must be informed by visions and needs from other scales and other perspectives, notably that of the Department of Water Affairs and Forestry. Government is guided by minimum requirements for resource protection for example through the classification system. In this way, the Department's custodianship of the relationship between resource protection and use is supported through legal means.

A water quality vision supports a catchment vision

Although water quality managers are mainly concerned with the water quality aspects of water resource management, it would not be wise to set a water quality vision, before setting a catchment vision. The visioning process described here is a vision for society's relationship with the water resource in its entirety, i.e. the aquatic system, within a defined geographic space, and what it provides to society. It is not a vision specific to water quality management only, although the catchment vision, when disaggregated into management objectives, will expose water quality specific objectives.

Chain of accountability

The objectives hierarchy ensures that operational objectives descend directly from the vision and, in this way, provides a pathway of accountability for both the water resource manager as well as civil society, since everyone participates in the generation of, and agreement on, the vision. Water resource managers can hold resource users accountable to their vision and the actions supporting it. Water resource users can hold water resource managers accountable to operational actions in that they must contribute to the collective vision.

SECTION 5: APPROACH TO CATCHMENT VISIONING

The process must reflect its intent

The 'low confidence' visioning process suggested here mimics the full participatory process. The difference between a 'low confidence' and 'high confidence' or full process is not what is done, but rather the intensity and inclusiveness of the process. For example, a single person in a regional office can follow the process suggested here and come up with a catchment vision and an objectives hierarchy.

Similarly, a regional manager can engage a group of key stakeholders in the process or the same process can be followed with many stakeholders. The amount of and the level on confidence in catchment related information obtained through CASs may increase the confidence of the vision. The difference lies in the intensity and inclusiveness of the process, how confident people are in the validity of the process and how acceptable the outcomes are perceived to be. The aim of the visioning tool is partly to sensitise facilitators of the process (e.g. regional managers and Catchment Management Agencies), to the intent and principles of catchment visioning as a process that should ultimately attract full stakeholder participation.

Existing participatory fora in a new context

In many areas of the country, catchment fora and similar interest- and action-oriented groups have been in existence for several years prior to the promulgation of the National Water Act, of 1998.

As a result, some areas may already have a fairly robust participatory process, perhaps requiring more inclusive participation, but already having a culture of articulating issues, discussing possible solutions and implementing actions. Such fora are in a good position to support the intent of water and environmental policy through the visioning process.

One of the shifts in thinking required would be for stakeholders to think and talk about, not only their issues and the solutions to these, but about how these issues affect and are affected by others that use the same resource. It requires participants to broaden the scope and context within which their issues and actions happen, thereby recognising that people are co-dependent on the resource.

But, it will be important to always use issues as a point of departure in the participatory process. People are much more motivated to talk about issues that affect them directly, compared to abstract aspects such as 'planning' or 'vision'. Imagine being invited to a meeting which aims to 'address your pressing issues' compared to an invitation to a meeting to 'plan a collective future'.

The latter generally does not excite people immediately – at least not until they can connect their particular issues to that future. Section 6 describes how issues are used to generate a collective context for formulating a vision.

A desired future condition

The process is based on an opportunity to define a desired future condition of the resource. Associated with this condition is the basket of goods and services that people need and want, and therefore also involves defining the appropriate levels of protection and use that will support the desired provision of resource goods and services. A future-focused approach prompts people to think about their collective future instead of being bogged down by past and current conflicts. This process is therefore concerned with creating a non-confrontational environment for defining a desired state and then identifying the operational steps that are required to promote progress towards this 'desired' future.

Visioning is iterative

The process provided here allows a regional office to start with a 'low confidence' vision and then to integrate the iterative visioning process with the continuous development of a stakeholder base (Figure 5.1). This approach recognises the time it takes to build a stakeholder base, against the current pressure and need to make decisions for water allocation. Initial decisions will then at least be informed by a low-confidence vision, that can be used in a systematic way and with an accountability pathway built into it.

Once a vision and associated goals are constructed, it should be taken to stakeholders who will be able to provide constructive comment on both the outcomes of the visioning process but also on the process itself. The vision can be revised following these inputs and used while the stakeholder base is built and empowered to provide inputs into the next round. With each round, confidence in the process and the acceptability of the outcome is enhanced. Confidence and acceptability will improve with an increasingly inclusive stakeholder base, improved information and a trusted process. Even though confidence and acceptability may be relatively low to start with, the process allows and promotes starting, despite imperfect knowledge and an incomplete stakeholder base. In this way, management can make the most informed decision possible at the time with a process that allows them to demonstrate accountability for the decision.

When a regional office takes a 'low confidence' vision, which was set without much public participation, to stakeholders, it will be important to encourage stakeholders to generate their own vision and for the regional office manager to use the 'low confidence' vision as a guide only. Do not try to make stakeholders accept the 'low confidence' version of a vision. The result will inevitably be one of conflict with stakeholders who will not buy into something they have not generated. Rather ask them to critique it according to what they perceive as the strengths and weaknesses of the vision (Figure 5.1).

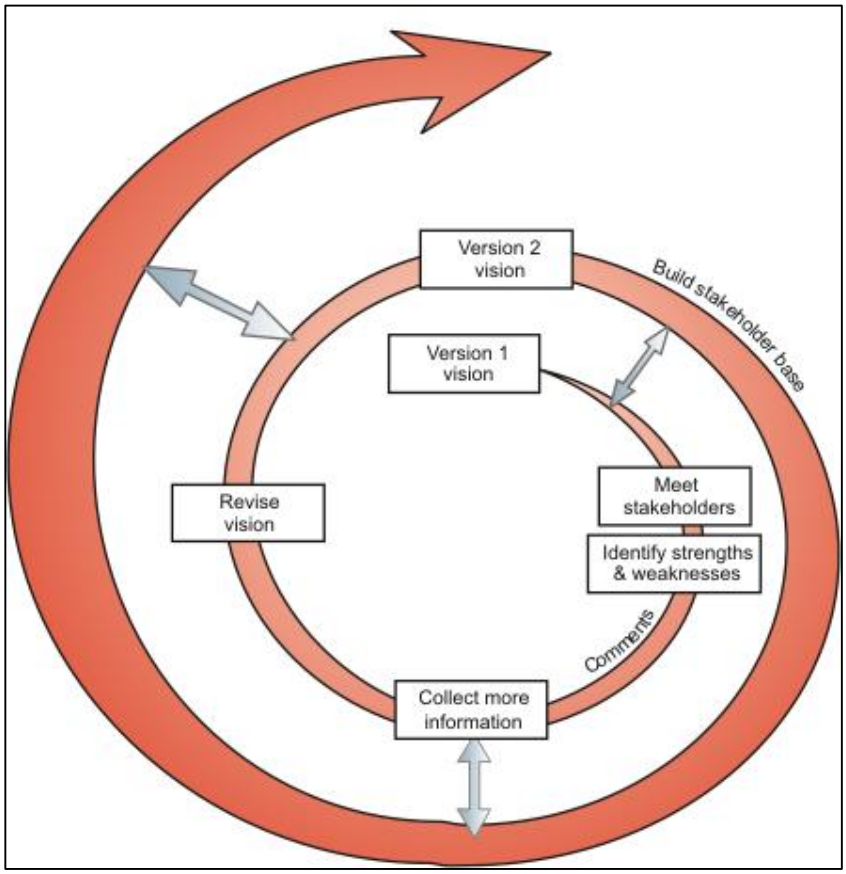


Figure 5.1: The relationship between a vision and the concurrent development of a stakeholder base. The thickness of the arrows represents degree of confidence in and acceptability of the vision

Importance of context

The vision is always situation- or context-specific. This means that the suggested process is strongly based on an understanding of the condition of the ecosystem (i.e. the water resource) and of society within a chosen area. A catchment vision that is not embedded within a specific context, will not reflect the social or resource circumstances of the area and thus will not promote buy-in or encourage the dialogue necessary to stimulate consensus-based agreements between different water resource users.

Baseline information to inform the context

Collect map/s, schematic or graphical representations of the catchment and information on the resource and social dynamics.

Describe the water resource template: major vegetation types, topography, etc.

Describe the water resources (major rivers, wetlands, groundwater and estuaries). Amongst others, consult Internal Strategic Perspectives, the catchment assessment study (CAS) report and National Water Resource Strategy, State-of-Rivers reports and Reserve determinations.

Describe how people are distributed and use the resource; identify land use types, e.g. use land cover and other types of maps. Use river conservation planning outputs to inform an assessment of the current state of the resource or as an indication of what the future conservation status should be. Generate familiarity around how each land use may affect integrated water resource management.

Describe interest groups that relate to the water resource – statutory and non-statutory organisations and also informal interest groups. Note that interest groups are not necessarily only resident in the catchment. Examples are academic institutions, trans-boundary / international neighbours. Take care to include interest groups that are not as well organised as other well-resourced sectors (i.e. the more visible and obvious ones). Sectors rarely encompass all interest groups, e.g. consider special interest groups e.g. fly-fishing clubs.

Describe the water resource goods and services of interest in the chosen area. Lists of existing lawful uses of the resource can be used as an input into this step. It may be useful to define these in terms of ecosystem services, as it is likely that this terminology will be widely understood by all users and interest groups. These uses should include not only water use, but use of all or any components of the aquatic ecosystem. Access the DWAF database of registered water and river users. This will help provide an indication of the types of goods and services currently used and valued by users.

Use Catchment assessment studies to create baseline context

In order to generate a vision, an idea of a preferred future, it is necessary to be somewhat confident in knowing what the current state of the water resource is. Because visioning is about a future to be shared by all water users, it is equally important to understand the current state in terms of user perspectives of the resource, and how they are organised and empowered (or not) to contribute to water resource sharing and management.

Catchment assessment studies are a good resource to help with the gathering of information about the current state for a catchment area and its people. Refer in particular to Part 2 of the Guide to Water Quality Catchment Assessment Studies. This document provides extensive guidelines to accessing information ranging from the biophysical attributes of a catchment and water resource to water quality patterns, administrative attributes, policy requirements, resource use and conservation, information about stakleholders and their affiliations, institutional arrangements and local, regional and national development plans and projections for future water use (DWAF, 2003).

Important caveats about information gathering

Caveat 1: A lot of information is available on various aspects of water resources and at various scales. The DWAF (2003) report on catchment assessment studies attests to this. It is not necessary to have all of that information in hand before starting a visioning process. In other words, do not wait until all information is in place before starting the visioning process. The adaptive approach espoused by the National Water Act acknowledges that management can and usually does proceed with imperfect and incomplete information (Rogers *et al*., 2000). An iterative, adaptive process allows for ongoing learning and for the incorporation of new information and new insights along the way. Waiting for a perfect and complete information base before starting, is likely to paralyse efforts to promote change.

Caveat 2: Most of the information that is available for catchments is technical information that has been compiled by engineers and biophysical scientists. While this information is important and necessary for the process, keep in mind that catchment and water resource allocation, sharing and management are social processes. Thus care should be taken to not allow technical inputs to dominate the process, simply because there is a lot of technical information available. Technical and scientific contributions must serve a social process of consensus-building around human preferences and values as they relate to the water resource (Van Wilgen *et al*., 2003). Integrated water resource management is intended to be a people-centered process. If facilitators of the process commit to this simple assumption, then caveat 2 is taken care of. Those who benefit by and / or bear the costs of resource use are the most valuable sources of information, knowledge and perceptions.

Interaction between visioning, class and RWQOs

The Department of Water Affairs and Forestry is responsible for a process for determining the Management Class (the classes being defined as Natural, Moderately used/impacted and Heavily used/impacted) A Management Class (a statutory requirement) represents a vision for a significant water resource, for example a river-reach. The water resource classification system provides for consistency in the description of management classes, or desired states. Each management class represents a permissible but different balance in the types and magnitude of water resource use and the mix of associated costs and benefits.

The Department is also tasked with ensuring that Resource Quality Objectives (RQOs) and Resource Water Quality Objectives (RWQOs) are derived from the Management Class. RWQOs refer to the water quality component of the Resource Quality Objectives, and they are thus a sub-component of Resource Quality Objectives. "RQOs are numerical or descriptive statements of the conditions which should be met in the receiving water resource in order to ensure that the water resource is protected" as referred to in the RWQO Guidelines. The Management Class, RQOs and RWQOs are derived via a systematic technical process.

How does visioning and the objectives hierarchy relate to these statutory instruments and objectives? How much weight should be attached to the technical instruments and their derivation compared to the participatory visioning process?

To make these decisions, there are two basic principles to follow:

- **Principle 1: visioning can work in the absence of technical instruments.** The power of the visioning process lies in being able to derive operational management objectives that can be drawn back directly to the catchment vision, thus making the objectives and their outcomes answer to the expressed human aspirations for the water resource. Thus, even in the absence of a Reserve determination, Management Class, RQOs and RWQO, the visioning process and objectives hierarchy will still provide a means to articulate the objectives of stakeholders (Rogers and Bestbier, 1997).

- **Principle 2: Public participation is critical for designing objectives in highly contested resources, but a more technical derivation of objectives must assist where public participation is weak.** The way in which the outputs of the visioning process should be used in conjunction with the technically derived instruments depends on the level of confidence required for the water resource allocation, and the extent to which the articulation of objectives can lean on the participatory process for a defined area. If the confidence in, and acceptability of the vision and visioning process are low (i.e. an immature participatory process), the management class derived via the technical process will carry more weight. By the same token, the visioning process should have an increasing influence as stakeholder needs and values are required for decisions, especially in highly contested situations.

For a while to come, most areas in South Africa will have a situation where there will be some degree of public engagement plus some capability for supporting objective-setting via more technical means and instruments. This mix in capability will vary over time and space. Figure 5.1 and its related text addresses this relationship to some extent. Public engagement in the resource management process should strenthen over time. But in the meantime, how do we integrate the outcomes of the objectives hierarchy with the technical instruments available?

As mentioned, the Objectives Hierarchy can function in its own and deliver detailed objectives relevant to operations management. But for integration purposes here, the lower level descriptive objectives of the objectives hierarchy can be used to inform the setting of the Management Class. The objectives hierarchy will deliver many different kinds of objectives. In Figure 1.2 for example, the lower level objective there relates to an issue of human health (faecal contamination) that is dependent on water quality. Some objectives from the hierarchy will relate to improved institutional needs, some to enhanced co-operative governance, some to resource protection, some to resource use and the benefits derived from resource use. The objectives that relate to the state of the resource plus those that relate to user needs can be ‘extracted’ and inserted into the more technical categories and process described in the RWQOs Guideline (DWAF, 2006). Resource quality categories plus user need categories are then used to generate the Management Class.

SECTION 6: GENERATING A VISION

Figure 6.1 at the end of the document (Annexure B) shows the steps for generating a vision and disaggregating it into component objectives.

Generating a vision

The function of a vision is to mobilise change from the current resource condition towards a desired future water resource condition. Because this process has implications for the goods and services provided and also for the associated costs and benefits, the process is as much about social change and negotiation around what people value, as it has to do with the condition of the water resource.

Thus, a vision provides a continuous 'pull' towards what is expressed as an improved water resource and societal conditions. But what does 'continuous improvement' mean? It means the continuous enhancement of societal well-being and economic development as supported by an ecosystem state that is continuously being enhanced in terms of its capability to support shifting/dynamic societal needs and preferences. Therefore a vision and its sub-components can be expressed in terms of what society demands of the water resource, and in terms of the ability of the ecosystem to supply goods and services to support the demand. A robust vision will therefore be based on the integration of values and preferences that are societal, technological, ecological, economic and political in nature. Coupled with this is the need for continuous improvement of the management systems and processes that move the resource management process forward.

The nature and legitimacy of the process are important

This guideline is based mainly on Rogers and Bestbier (1997) and Van Wilgen *et al*., (2003). The Rogers and Bestbier report provides a scientifically rigorous process for disaggregating a desired future state into component management objectives, while the Van Wilgen study shows the appropriate principles and processes to be followed in a multi-interest, multi-sectoral stakeholder environment. Both studies show that with a visioning process, **the nature of the process is as important as the outcome of that process**. If the process is fair and inclusive, allowing stakeholder views and interests to be respected and incorporated, support for the outcomes will tend to be a natural outflow of support for the process and the way it is conducted.

Visioning is like a journey

An analogy of a vacation journey describes the visioning process quite accurately. The journey has three important aspects, namely the vision (the vision is to have a good vacation), the road rules (i.e. the guiding principles) and the road map (i.e. the context). As we start out, we might discover picturesque and enjoyable side-routes. What this means is that our understanding of the context changes and grows as we travel and encounter real-world siuations and options; and we may adjust our route to achieving the vision as our understanding of the 'map' changes. Also note that the vision is not only only the way to get to destination x, but to have an enjoyable vacation. We may want to rethink the destination as we go along according to what we achieve along the route and based on our understanding of what we want and need, i.e. our understanding of the vision.

Golden rules of the process

Some so-called "rules of thumb" guide the entire process and, if ever a group or facilitator feels they are 'stuck', they should return to the following basics. Ideally, these aspects should be cross-checked at each step of the visioning process:

- As you begin to explore a new aspect of the process, get everyone to put their cards on the table **before** trying to promote agreement on **issues**. Ask each person to say what they think are priority issues and should be priority uses of the water resource in the catchment. Write each one down for everyone to see. Take care **not to debate** the issues as you get them, as this could lead to fights. **The point is to get all the issues out** visibly so that stakeholders can view them as a collection of catchment issues and to note that these issues are interdependent and collectively belong to the catchment community;

- Two golden rules for everyone to follow are: (1) no-one's perspective counts less than another. The facilitator may ask for clarification of what someone means but the most important point is to accept a stakeholder's perception of an issue; and (2) you are more likely to get what you need by helping others get what they need. People can only see each other's issues and realise interdependencies through a collective process. These two rules underpin a consensus-based approach to joint decision-making and reduce conflict;

- Discuss the collection of perceptions to ensure people understand them and their implications. Do not try to reach agreement on them;

- Synthesise the ideas by grouping like ideas into fewer statements and recognising conflicting ideas; and

- Do not prioritise, as the process is designed to filter out incompatibilities. In other words, less important things are filtered out automatically through the process because people begin to focus on the important few they can and are willing to deal with.

STEP 1: Select a geographical area for the vision

Purpose

A vision must correspond with some defined geographical area. This defined area must make sense in that it should capture a sufficient diversity of interests in the resource to generate incentives for the interest groups in question to work together towards a common objective.

Process

Divide the WMA into components and sub-components that will make sensible units for visioning. A whole WMA may be too large for all users to relate to the same vision. On the other hand, a whole quaternary catchment might be occupied by one land use and say 3 landowners. It would also not make sense to create a vision for that group because they may not have any reason for collective action.

Guiding selection criteria:

- Catchment boundaries, especially secondary and tertiary. However, this is not prescriptive. It may make sense, for example, to expand the choice of area for a vision beyond a catchment boundary to capture one or more interest groups that has an impact on, or interest in the resource within the catchment in question.
- Try to capture within the geographical area for visioning, a diversity of users and interests. (Be careful to not focus only on consumptive use! - interests may be based on scenic benefit or recreation, i.e. non-consumptive use of the water resource is also a 'use' because it accrues to benefit).
- Try to capture as large a degree of interdependencies as possible, since interdependent use requires people to enter into conversations with one another. This is important because the conversations around use and balancing use types, once they gain momentum, tend to drive the decision-making process.
- Prioritise which areas must be dealt with first:

Guiding questions are:

- Which area has the biggest backlog in the water allocation process?
- Which area has the most important backlog in the allocation (licensing) process? For example, one area may not have many license applications waiting to be processed, but may have one or two users that are desperate for finalisation of allocation in terms of their livelihoods, or business processes.
- Identify the areas where the (societal) demand and (resource) supply situation is such that the resource is stressed, i.e. it is unable to supply the current demand of a suite of services in a sustainable way. Indicators of this may be the expression, by users, that they are unable to derive the services they require, and / or other signs of this, i.e. a state of the water resource that cannot satisfy even the current need for services. Instruments or information that can assist with this is for example information from the Internal Strategic Perspectives process. The National Water Resource Strategy will also provide information to support this decision.

Principles

The main principle here is to capture a diversity of interests and interdependencies within a sensible geographical area, so that the vision will be (1) relatable to the group of interested parties, and (2) combine a critical mass of diverse and competing interests to drive a need for co-operative behaviour around balancing use types and levels.

STEP 2: Prepare material

Purpose

To ensure that relevant materials for STEPS 6 to 11 are available. Much of this baseline material should be collected earlier (see section 5: Approach to visioning). This step serves to revisit that information and to identify gaps in information that may be addressed so that more relevant information is available in the following iteration of the visioning process.

Process

Collect material that is relevant to and that will support STEPS 6 to 11 of Figure 6.1. An example of a bundle of information for generating a catchment vision for a chosen area is given in Section 5. Note that while written information relevant to the catchment and its stakeholders will help to provide background, some of the most important information lies in people's expressions of their needs and preferences as they relate to the water resource.

For many catchments, a lot of technical information will be available, for example through Catchment Assessment Studies. Organising this information into a useful format for generating say, a managers' first pass perspective of what is currently happening or has historically happened in the catchment, may be a daunting task. There is also a need to link this catchment information to considerations for overall sustainability, including social and economic considerations together with ecosystem aspects. Structuring this information into useful categories of catchment observations and using sustainability indicators in conjunction with current state data to come up with scenarios and possible trajectories of change for the catchment and for the resource in the future, warrants another study and is beyond the scope of this guideline. However these sorts of syntheses of assessments will become increasingly important. They are needed not only to help make an educated guess as to possible visions and resource quality objectives, but also to assist in probing how the current state and possible trajectories of change might influence the future.

STEP 3: Set up workshop and facilitator

Purpose

To set up a workshop, identifying individuals to participate and to identify and involve an appropriate facilitator.

Process

- Organise a workshop with regional office staff. Also involve, wherever possible, regional folk from other relevant government departments and local government (in particular those who are involved in Integrated Development Planning) and knowledgable stakeholders.
- Select people who are likely to bring to the workshop diverse perspectives and experiences, i.e. people who work with different aspects of water resource management, operational managers and higher-level managers, people working at different scales. It will be important to involve key stakeholders because they have knowledge and experience of what happens on the ground.
- Be careful to avoid bias towards any one water user sector and to not only choose like-minded people, i.e. people who tend to agree with each other most of the time.

- Invite an appropriate facilitator. During this phase of growing an understanding of how a vision should be generated, it will be essential for the regional team to make use of a facilitator who has a good grounding in the intent and process of catchment visioning as it relates to integrated water resource management.
- Remove the team from the usual office environment for the duration of the workshop. Try to hold the workshop in a place that stimulates creative thinking.

Principles

The facilitator's role in the visioning process is critical, because he or she is not simply the driver and regulator of the process, but can also influence the spirit by which the process is conducted. (See Sherwill and Rogers, in prep., for more detail). It will be easy to follow a process as set out by the National Water Act and related policy documents, but this could fall far short of the intended outcome. The following principles of facilitation promote a workshop environment that is aligned with what we understand the intended outcome of the National Water Act to be.

- Facilitators must strive to create an environment that promotes new insights and shared understanding. This means that each perspective must be respected and given a fair chance of audience.
- It is the facilitator's responsibility to ensure that discussion is inclusive. Contributions must be heard from all participants and the discussion should promote a leveling of the playing field (i.e. promoting equity). This will only work well if the workshop team has done good homework around discovering the full suite of interest groups in question (See Annexure A for an example of a stakeholder list for a process aimed at the level of a tertiary catchment).
- Co-evolution of perspectives and interests toward consensus can only take place in an atmosphere of mutual trust and openness. This approach encourages disclosure of interests and agendas and this is critical, since the balancing of different types and magnitudes of water resource use between water resource users will only be sound if they incorporate and reflect the full suite of interests. This issue is probably more relevant to the full participation process, but the principle should be followed even with the initial process with fewer participants.
- The facilitator needs to keep interaction and dialogue between participants constructive. Strive to achieve consensual agreement (it requires that participants have a willingness to change their perceptions in response to hearing the perspectives of others) rather than promoting counter-arguments to produce a 'winner'.
- Facilitation must be aimed at keeping the attention of participants' focussed on the future. Looking to the future gives public participation positive purpose. Shared medium- and long-term objectives enable participants to find common ground in the presence of often conflicting perceptions about the present.
- The process must be given as long as it needs. An important aspect is for the facilitator to keep the process true to the guiding principles (see STEP 5) and to maintain a balance between getting the issues exposed but keeping within a reasonable time frame.

STEP 4: Find and consider an existing vision

Purpose

If any form of vision exists for the defined area, or for any sub-area, the team should make use of the vision and also of the material and knowledge that were gathered to derive that vision, as far as this is possible and appropriate. Not all forms of vision will have been developed with this particular process in mind, but there will be much value in drawing from the insights and knowledge of other visioning processes and products, in particular for the phase where the team develops a joint context (See STEP 6).

Source visions at levels other than for the catchment in question but which might have bearing on the catchment in question. Examples of this might be Integrated Development Plans (IDP), Spatial Development Initiatives and national level goals. National level goals will often be couched as overarching principles (see Section 3). Consider how such visions for the future may interact with the catchment vision and try to involve representatives of those visions in the catchment visioning process. Attempts to achieve synergy between different user and use type visions (i.e. individuals and sectors with diverse interests), different levels or scales of visions (e.g. nested catchments) and different types of visions (e.g. IDP and catchment visions) forms the basis for co-operative governance.

Process

Consult relevant people to find out if one or more visions exist for the area in question or for adjacent areas, or for areas that may be nested within the chosen area. Most often this will be DWAF regional (catchment forum visions) and national offices, but also consult the regional Department of Environmental Affairs and Tourism and conservation authorities.

Examples:

- Existing water resource planning processes: e.g. Plettenberg Bay Catchment Management Planning Process, Kruger National Park management plan
- Spatial Development Initiatives
- Strategic Environmental Assessments (SEAs) and plans
- Integrated Development Plans (IDPs) (source: local government)
- Visions generated by other catchment forums

If the process followed to derive other visions clearly had the same purpose and context as this process, and circumstances have not changed since it was developed, then make use of these vision/s. Sector-specific visions are typically not suitable to use because they will not encourage buy-in and ownership from catchment stakeholders and thus cannot provide a sound basis for collective action.

Principles

In order to ensure equity, use an existing vision if:

- It is based on diverse stakeholder/interest group input and is not biased toward any particular water user group;
- If the vision was generated recently enough to capture at least the majority of existing interests in the water resource;

Otherwise, generate a ‘low confidence’ vision according to STEPS 5 - 7.

STEP 5. Agree on guiding principles

Define principles

Identify the principles that will guide planning, decision making and management for the desired state. These principles describe the core values of the community involved and are used as the 'rules' to which everyone will adhere to while developing and moving towards the desired future. They should be used as checks and balances at each step of the objectives hierarchy development process. The box below provides examples of guiding principles chosen by a set of catchment stakeholders.

EXAMPLES OF GUIDING PRINCIPLES (from WRC project, see Van Wilgen *et al*., 2003)

Holistic/integrated: A shared resource requires a common vision and co-ordinated action

Co-operative governance: Working partnerships must be created both vertically and horizontally

Equity: There should be equity in access to the resource, and the distribution of costs and benefits; Revenue should be generated from all who benefit from management of the resource.

Efficiency: Management and administration processes should work towards speedy and efficient service delivery.

Empowering civil society: Civil society should be informed and active; the importance of a bottom-up approach must be recognised; a sense of shared ownership and responsibility must be created.

Adaptive: Policies and processes should be able to improve with experience; the CMA and all levels of stakeholder representation should be transparent, accountable and challengeable.

STEP 6: Generate collective catchment context

Purpose

The purpose of STEP 6 is to generate a shared understanding of the current state of the area in question. This provides the context for envisioning the future. **Current state does not refer to the state of the water resource only, but also to the current state of societal issues and values affecting patterns of water resource use.**

This step builds common understanding, within the visioning team, of the current state of the water resource, and of the people whose well-being depend on it and what goods and services they value. It allows the catchment visioning team to adopt a perspective as though they were the collection of interest groups.

The information generated by this step relates strongly to the Catchment Assessment Study (DWAF, 2003), a process used by the Department of Water Affairs and Forestry to understand the current state of the catchment so that this knowledge adequately informs the desired future state.

Process

This step relates strongly to the 'golden rules' of this Section. When the meetings start to involve stakeholders, encourage them to descibe their water resource issues. This will provide a description of the context as stakeholders see it. Together with water users, develop a shared understanding of the context of the chosen area, its people and their water resource issues at local, regional, national and international levels and at ecological, technical, socio-economic, governance, policy and legal levels. This step requires considerable brainstorming, knowledge of the literature, local conditions and policies, governmental policies and international agreements. This step will lean on the baseline information collected in STEP 2.

- Help water resource users to express their issues. Good questions to start with are: why are you here? What are your water resource issues?
- Identify, if information is available, services provided by the water resource in the past. Stakeholders often want these restored.
- Identify interdependencies between interest groups. Water resource users are interdependent when the access to, and use patterns of, the water resource by one stakeholder affects another. The point is that users are often unaware of these. Part of the objective of discussing and building context is to make these interdependencies explicit (see Table 6.1).
- Identify, broadly, the strengths and weaknesses of the system. Develop a sense of trajectories of change. Typical questions may be: Does any aspect of the water resource or people's relationship with the water resource seem to be improving or deteriorating? Why? What was the water resource like and how has it changed over time?

Discussion about these aspects (without focusing too hard on the details) will prompt participants to place their perceptions of context on the table.

- These steps are simple, but an important outcome is the joint understanding that encourages the catchment visioning group to new insights of how other people view and use the water resource.

Table 6.1: Example of interdependencies for a hypothetical catchment

Interest and beneficiaries	Aquatic ecosystem services	Impacts on other users/interested parties	Impacted on by other uses	Notes about interdependencies
Fly-fishing in river headwaters (Fly fishing club)	Trout fishing and scenic beauty	Access to certain parts of the main stem river headwaters restricted or blocked.	Harvesting activities of upstream forestry affecting TDS and trout survival. Sawmill settling ponds discharging into river – water quality impacts.	River water turbidity at times of timber harvesting seems to be the impact of greatest concern here.
Scenic beauty and safety of resource. Town inhabitants and tourists	Attractive riparian zone and close contact with this through picnic sights on river bank.	None	Upstream sewerage works not well managed and spills occur at times.	Spills are sporadic but safety issues (high *E. coli* levels) warrant high priority attention to this issue.
Irrigation water (adequate quality and assurance of supply) for subtropical fruit production.	Water provision.	Affects flow and quality of water use by downstream irrigators. Downstream protected area with RAMSAR wetland dependent on flows downstream of irrigation.	Affected by upstream water use by forest plantations. Some farms affected by upstream sewerage spills.	This is both a volume and quality issue. Flow levels noticeably higher during dry season since forestry removed plantation tress from riparian zone.
Informal agriculture – growing madumbi's in riparian zone.	Moisture in riparian zone soils; medicinal plants.	Unknown.	Probably all upstream water use.	Need better information on this use type to understand interdependencies.

Understanding interdependencies assists allocation decisions

A structure such as that shown in Table 6.1 will indicate which groups are directly dependent on the water resource for their livelihood, and which groups are more interested in the water resource from a purely economic or business perspective. It should highlight non-consumptive use of the water resource, an aspect of water resource use that is often overlooked when categorising use according to sectors. (These aspects relate to ensuring equity and, through equity, ensuring sustainability). The table encourages the team to start thinking about interdependencies. It will be these interdependencies (both their nature and their magnitude) that will most likely drive decisions around general authorisations, and license conditions.

How to ask questions

The way questions are posed to expose perceptions and issues is critically important to encourage responses that are meaningful to the facilitators but that will also build confidence in stakeholders that they are being heard. Avoid questions that require a 'yes' or 'no' response. Such answers will not help to develop insight.

Avoid a "if x, then y" situation in the visioning process. The visioning process is not supposed to yield predictive results to be fed into a technical system. Rather, the process should deepen understanding of how water users value the water resource in diverse ways, so that reconciliation between these values can happen. The technical part of the allocation process (i.e. licensing) then supports what has been socially agreed on.

Keep questions simple. Annexure B contains an example of a single question asked of river stakeholders in the Inkomati catchment. The question was simply: "Why are you here?" Water resource users responded eagerly and the facilitator then organised the responses into categories of issues, which laid the foundation for developing the vision statement. Once the vision statement was generated, stakeholders proposed elements of a strategy by responding to the simple question: "name two steps which you think are important to achieving the vision".

The responses to this are included in Annexure A. Be careful of too much technical terminology. If the facilitator has an interest in the type of water resource use, consider the difference between these two types of questions: "How do you use your river and what sorts of benefits are there for you?" compared to "What do you use the water resources in your management unit for"? Imagine you are a water resource user in rural eastern Cape. You may respond better to the type of terminology in the first question!

Principles for STEP 6.

Try to identify all interest groups, not just the ones that are well organised or highly visible. Identify interests groups that have not yet been represented and make provision for such groups in the conversation around needs and preferences and use impacts. Insufficiently resourced or disempowered interest groups may be missed. Failure to consider them from the 'low confidence' and subsequent catchment visioning process may lead to decisions that omit some needs and would lead to preferential allocation to established and more powerful groups.

Focus on a common language. Ecosystem services language is useful as it allows people to express water resource use and benefits in terms of human well-being. This will be especially important once the full stakeholder process is operational, since most water resource users will struggle to describe their needs and preferences in purely technical and/or scientific terms (Van Wyk *et al*., 2003). Common language promotes confidence and joint understanding and through this, encourages entry into conversation and decisions. Thus, equity through inclusiveness is promoted.

STEP 7: Formulate a vision

Purpose

Discussing and generating a joint perception around context and current state (STEP 6) leads the catchment visioning team to a joint understanding of current issues, problems and points of strength. These provide the starting point for catchment vision because it encourages a change in thinking towards an improved future. Usually a diversity of issues will emerge and it indicates that the current state is not desirable. This highlights the need for change and generates the momentum to drive it.

Process

The process relates to what was said in Section 6 of this report under the heading "Golden rules". Discussion of the context will produce issues. Group these issues to formulate a vision. For example, stakeholders in the Inkomati WMA came up with issues that were grouped according to **Land use, River use, Development, Equity and Sustainability:**

- *Land use*: healthy banks, no erosion
- *River use*: Healthy beautiful river, maintain biodiversity and uses that it benefits, maintain supply of indigenous fruits, crops and medicines, rehabilitation beyond conservation areas.
- *Development*: Provide employment that benefits local people, provide basic services, cultural and recreational tourism development, agricultural development.
- *Equity*: Equitable access to the water resource, equitable distribution of costs and benefits.
- *Sustainability*: Maintain health of water resource, and profitability of economic activities, protect our children's heritage, environmental

capacity known and respected, future options not foreclosed, transparency and accountability to achieve a sustainable management system.

(Note: these issues were elicited using an ecosystem services terminology to which everyone could relate).

Tip: Record any reference to a better future, even if it is not necessarily connected to a particular issue. Often, people have a sense of what future benefits the aquatic ecosystem can offer, without this notion being fixed to a current problem or issue. It is important to capture these statements, because the approach to visioning given here makes provision for creating a generative future, as opposed to choosing between a limited number of options or scenarios.

Based on this, the facilitator can construct the vision as follows:

Inkomati stakeholders, July 2000

> *We are proud custodians of our rivers.*
> *They sustain our economy and heritage.*
> *We protect and manage them so that they can*
> *Continuously bring benefits equitably to our people,*
> *The nation, and our neighbours.*

This vision was constructed for example from the bundle of issue statements expressed by Inkomati stakeholders. If a catchment forum is in place, bounce the vision off this group to test its acceptability to a diverse group.

Other examples of visions are:

Plettenberg Bay Catchment Community

> *Ensure the wise use of all water resources and maintain an adequate supply of acceptable quality to all users to sustain the prosperity and integrity of the natural environment of the catchment areas of the Piesang, Bitou, Keurbooms, Groot, Matjies and Sout Rivers.*

Blesbokspruit Catchment Forum Charter

> *To promote a healthy, safe and sustainable environment that is fit for all uses through interactive stakeholder participation within the Blesbokspruit catchment.*

Kruger National Park

> *To maintain biodiversity in all its natural facets and fluxes and to provide human benefits in keeping with the mission of the National Parks Board in a manner which detracts as little as possible from the wilderness qualities of the Kruger National Park.*

Principles for STEP 7

Follow facilitation principles as in STEP 3.

SECTION 7: FROM A VISION TO OBJECTIVES

Achievable management objectives

A vision that correctly reflects societal needs and preferences can be disaggregated into management goals that serve the collective societal expression of a better future, as it relates to the resource.

An objectives hierarchy (See Rogers and Bestbier, 1997) provides a structured and rigorous way to do this. Importantly, this way of defining and using a desired future state provides an accountability pathway and focuses on taking small steps at a time while keeping the ultimate desired future state in mind. This is critical in terms of creating achievable objectives over various time scales so that participants have a sense of achievement and motivation (Roux, 2001).

Refer back to Figure 1.2. This is an example of a vision that is partially disaggragated into objetives to illustrate how the objectives hierarchy is constructed. Note that, starting from the broad vision, key elements of the vision statement are identified and pulled out. Higher-level objectives are then set for those key elements. Again, key elements of these higher-level objectives are identified and pulled out to produce sub-objectives and the process is repeated and a series of objectives of increasing detail and specificity is generated. **Each objective is set so as to maintain vital attributes and strengths and to overcome constraints and threats.**

The process of identifying key elements, and setting different levels of objectives that are sensitive to strengths and constraints, is thus iterative. Eventually, the objectives at the lower end of the hierarchy are so detailed that operational managers can start to regognise them as management objectives that relate to their day-to-day tasks. Refer to Rogers and Bestbier (1997) for an example of a fully disaggregated objectives hierarchy. STEPS 8 to 11 are extracts from the Rogers and Bestbier (1997) objectives hierarchy process to illustrate key components of the vision disaggregation process.

STEP 8: Define strengths of the system

Defining system strengths

A strength is a positive characteristic of the system to be managed and may be scientific, ecological, value judgements, legal, historic and socio-economic. Resource managers want to maintain system strengths and overcome constraints.

- List all the known and perceived, current and future strengths of the social-ecological system. Current strengths may be determined from lists of ecosystem characteristics and vital attributes, e.g. species diversity and landscape types, and other attributes that are relevant to IWRM. Scenario modelling may be useful for identifying possible future strengths.
- Discuss and evaluate the list of strengths to reduce it to the essential elements that are compatible with the vision. The strengths describe the fundamental purpose of integrated water resource management.

STEP 9: Evaluate strengths

System strengths expose opportunities to balance use.

Use a matrix to indicate compatible and incompatible strengths. (This may be the point at which balancing uses becomes critical, where compatible and apparently incompatible aspects of resource use become explicit). Strengths can be sifted, grouped together in logical groupings, and condensed. Thus, the end product of this step would be a concise list of strengths that would form the focus of management efforts.

Facilitation principle: Personal values play an important role in this step. Look for common ground opportunities to rationalise the list of strengths to ensure compatibility with the vision and guiding principles.

STEP 10: Determinants of and constraints and threats to strengths

Maintain system strengths and overcome constraints

A major purpose of management is to ensure the maintenance of the factors determining and maintaining the strengths of the system.

- List all the determinants of, and constraints and threats to, the condensed list of strengths. Several instruments can be helpful in doing this, such as matrices. An example of a matrix (see Table 7.1) from Rogers and Bestbier (1997) is provided here.

Table 7.1: An example of a matrix used in assigning determinants, threats and constraints to two of the strengths of Nylsvley Nature Reserve (from Rogers and Bestbier, 1997)

Strengths	Determinant	Threat	Constraint
A good information base.	History of involvement: academic, research & management.	Lack of support from funding agencies.	The nature reserve is a very small part of the floodplain and catchment; lack of understanding of the system as a whole. Information is not in a user-friendly format. Management does not have clear goals and therefore does not demonstrate their information requirements clearly.
It is an excellent breeding and staging site for nomadic aquatic birds.	Hydrological regime drives wetland processes, water quantity and quality. Grazing and fire regime on nature reserve influences breeding and other life history strategies.	Water resources development in catchment is a threat to the hydrological regime (water is scarce) – extraction is a high risk. Exotic plants in the catchment – alter water quantity (reduce runoff) and quality.	Management does not know how to, and have not, explicitly managed for birds.

STEP 11: Define objectives

Set objectives to enhance strengths and overcome constraints

Objectives are set to ensure the maintenance of identified strengths and vital attributes, and to overcome constraints and threats to achieving the vision. Examples are provided in Table 7.2.

A hierarchical approach should be adopted to formulate a set of nested objectives of increasing rigour and achievability. This is an iterative process involving identifying, structuring and analysing objectives, and understanding how they relate to each other.

Objectives at different levels of the objectives hierarchy can be used to direct operations at different levels in the management institution, or other institutions that form part of management.

Table 7.2: Examples of objectives emerging from the vision, taken from Rogers and Bestbier (1997), objectives for Riverine Biodiversity for the Kruger National Park.

OBJECTIVE TYPE	EXAMPLE OF OBJECTIVE
Research	Understand natural fluxes in key components of aquatic biodiversity with a view to servicing the establishment of Thresholds of Potential Concern (targets).
Management	Integrate the activities of alien species control officers into the river programme.
Monitoring	Catalogue riverine biodiversity and any trends of change.
Information systems	Provide guidelines for sharing of data and products.

From vision to RWQOs through the objectives hierachy

The management objectives derived from the objective hierarchy process will be descriptive of aspirations that relate to either ecological categories or to water user categories or to institutional or governance arrangements (Figure 1.2). Those that relate to ecological categories or to water use categories can be used in conjunction to derive the management class, as described by the RWQOs Guideline. RWQOss are then derived from the Class. See Section 5 for detail on how to integrate objectives from the objectives hierarchy with the more technical derivation of the Management Class as described in the RWQOs Guideline.

SECTION 8: CONCLUSION

Back to basics

A basic recommendation about the visioning process is to keep it simple and to commit and stick to the basic principles of the process. A good facilitator is key to start mobilising stakeholders – to provide a structured but generative process to get stakeholders excited about participation and new friendships they are forging in the process. Much work remains to be done and this guideline can be expanded on and developed further in many ways. However, the visioning process described here allows a robust and defendible start – albeit with imperfect information but built on the values and inspiration that make water resources management the perfect vehicle for rebuilding our nation.

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Annexure A: List of Stakeholders

An example of a list (non-exhaustive) of water resource stakeholders in the Sabie-Sand catchment (as during November 2003). Adapted from Van Wyk *et a*l., (2006b).

Sector	Interest grouping	Organisation	Catchment
Regulators	Department of Water Affairs and Forestry	Nelspruit Regional Office	Sabie-Sand
	Irrigation Boards	Sabie River Irrigation Board	Sabie
		White Waters Major Irrigation Board	Sabie
	Local Government	Bohlabela District Council	Sabie-Sand
	Tribal Authority	Hoxane Tribal Authority	Sabie
Major resource users	Forestry	Global Forest Products	Sabie
	Agriculture	Mpumalanga Department of Agriculture, Environment & Conservation	Sabie
		Mpumalanga African Farmers Union	Sabie
		Individual small-scale irrigation farmer	Sabie
	Domestic use	Bushbuckridge Water Board	Sabie-Sand
		Belfast villagers doing laundry at river	Sabie
	Conservation	Kruger National Park	Sabie-Sand
		Mpumalanga Parks Board	Sabie
		Hazyview-Kiepersol ConserVancy	Sabie
	Tourism	Hazyview Tourism Authority	Sabie
		Induna Adventures	Sabie
Non-government organizations		Association for Water and Rural Development (AWARD)	Sand
Multi-sectoral fora		Sabie River Working Group	Sabie-Sand

Annexure B:
Extracts from a workshop synthesis

Extracts from a workshop synthesis: developing a process for stakeholder engagement for river management in the Inkomati Water Management Area (2002). Refer to Van Wilgen *et al.,* (2003) for details of this Water Research Commission funded project.

The example illustrates a possible process and interaction with stakeholders and how information and values were sourced and organised. This example only refers to what happens leading up to the formulation, in other words STEPS 5 to 7 in Figure 6 of the end of this section. It does not deal with how the vision is disaggregated into sub-objectives (Rogers and Bestbier, 1997 provides much detail on that and an example).

The following example can be broken down into the following:

- **ISSUES**: what is wrong, why are we here?
- **GROUPING OF ISSUES**
- **WHAT DOES AN IMPROVED PICTURE LOOK LIKE?** (the 'more desirable future')
- **GROUPING OF ASPECTS THAT DESCRIBE A BETTER FUTURE**
- **THE VISION STATEMENT**

In this particular case, the stakeholders were engaging and confident to the extent that the facilitating team could assist them in producing a broad, local-level but structured strategy to move toward an improved future.

Flip chart summaries of participants' inputs:

Question: *Why are we here?*

Note that this simple question helps stakeholders produce a lot of information about how they value the water resource, both currently and in the past, and what they think is wrong and how they think their future could improve. Note that stakeholder inputs are not deemed to be right or wrong. This is **their** context and issues, how they perceive and experience it.

Stakeholder 1:

- Water is scarce
- How will we manage our expectations?
- How will we jointly make decisions?

Stakeholder 2:

- Management system for our resource (democratic – *consensus/participation*)
- Grass roots Task Teams learn to protect resource (*x 2 = infrastructure and ecosystem)*
- Task Teams educate community
- Protect water users from violence*
- Management must be community-driven

Stakeholder 3:

- Equitable allocation
- Strategy to improve legislation
- Control illegal water use*
- Financing mechanisms for service delivery

Stakeholder 4:

- Correcting past inequities in access to water, land and finance
- Improve administrative and legal framework to better serve equity
- *Empower Task Teams*
- *COOPERATIVE GOVERNANCE AT ALL LEVELS*

Stakeholder 5:

- Equitable allocation
- Protect infrastructure

Stakeholder 6:

- Distribution to villages will also result in river protection
- Indigenous knowledge of water conservation (Consult elders)

Stakeholder 7:

- Change irrigation techniques (micro-systems)
- Better stock management to protect river → water points, grazing areas
- Dept. of Education → water care
- Better farming practice to reduce erosion
- More appropriate crops, and better timing (crop rotation) to conserve water
- Better distribution to reduce wastage
- Farmers to educate employees in water conservation
- *MATCH FARMING SYSTEM TO SOIL AND WATER and markets*

Stakeholder 8:

- How to get a common vision for the future
- Avoid conflict - “unity in diversity”
- Recognise variability is central issue

Stakeholder 9:

- Understand what we have: total resource and Reserve etc.
- Holistic (incl. population issues) catchment approach (across international boundaries)
- Reward/penalty system
- Across-the-board education

Stakeholder 10:

- Protect investment (historical financial obligations)
- Technical support in maintaining resource quality (pollution control) and infrastructure, legal advice
- Broad, equitable ‘tax’ base

Stakeholder 11:

- Improve river condition
- Co-operative governance
- Upstream users → improve land management
- Upstream users → pollution control (industry, mining, farming, domestic)

Stakeholder 12:

- Negotiate
- Technical and administrative support from DWAF/Agric

Stakeholder 13:

- Mechanism to stop destruction of resource
- Extension to improve irrigation practice and finance for infrastructure
- Government (Agric, DWAF, Education) educate youth on water and land use
- Holistic approach - treat causes not symptoms

Stakeholder 14:

- Skills development
- Access to admin. knowledge and technical/legal people
- Mutual support systems, structures/networks at grassroots level & financed
- Public awareness of CMAs role and functions in community

Stakeholder 15:

- Balance water use and protection
- Broad 'tax' base, reward/penalty system
- Long-term commitment
- Holistic and strategic catchment approach
- Market-driven better management

Issues presently affecting natural resource use within the catchment

Stakeholders' responses to the question "why are we here?" were grouped and organised by the facilitator into **issues**.

Extract from the workshop synthesis:

> It is clear that stakeholders within the catchment are presently facing a wide range of problems in natural resource management. Some of these concerns result from the limitations of past political and management systems. Others have arisen with the transition to a new system. The issues raised are diverse and complex, and may be broadly grouped as follows:

Policy and legislation

- Lack of clarity about new legislation and conflicting interpretations of its implications.

e.g. Future government ownership of dams that were previously privately owned.

e.g. The implications of previous scheduling statuses of redistributed land, and the criteria for classification as an "existing water user" under the Act.

- Lack of clarity about interim procedures to be followed.

e.g. Rewarding of a temporary licence prior to the determination of the Reserve.

- Concern about the protection of historic investments under the new legislation.

e.g. Whether a future allocation will be able to provide sufficient returns on previous long-term investments in private infrastructure.

- Concern about future pricing strategies.

e.g. Whether agriculture and forestry will pay a greater proportion of total catchment management costs than is warranted by their use of catchment resources (water).

Resources

- The scarcity and finite nature of water resources and the variability of their supply.

e.g. A noticeable long-term decline in the level of rivers, and the severity of the effects of recent droughts on water users.

- Threats to rivers and ecosystems from pollution and poor land use.

e.g. Poor water quality due to industries upstream.

e.g. Increased erosion due to farming on river banks.

- Increasing demands for water, and the need for reallocation of the resource.

e.g. Growing populations, and a large number of emerging farmers who require access to water.

- The need for quantification of the total resource, the Reserve and the amount available for allocation.
- The urgency of a preliminary estimate of the allocatable amount to enable economic activity to continue.
- The need for a system to monitor the resource and manage its use.

e.g. Monitoring and controlling the amount of water pumped from the river.

- The need for long-term vision on a catchment scale to ensure sustainability and an optimal balance between use and protection of the resource.
- The need for a holistic approach to integrate the use of land and water, and social, economic and environmental goals.

e.g. Identifying appropriate combinations of soil type, water availability, crops, farming practices and markets, on a catchment scale.

- The need for strategic and informed decision-making.

Administration

- Delays in the transfer of land ownership.

e.g. Status of farmer must progress from 'permission to occupy' to title deed holder in order to obtain an allocation of water.

- The need for integrated and democratic management systems.

e.g. CMC members must have a mandate from the people they represent.

- The role and responsibilities of community-based/local organizations within the overall management system.

e.g. Local responsibility for management of recreational water use.

- The need for co-operative governance, both vertically – between the different levels of government, from local to national – and horizontally – between government departments (in particular DWAF, DALA, DEAT), between user sectors and geographical areas, and to involve the broader community.

e.g. Lack of co-operation between the departments of Water Affairs and Agriculture in allocating water to emerging farmers.

- Uncertainty about licensing procedures.

Capacity / Empowerment

- Researching and using indigenous knowledge.

e.g. Consulting tribal elders about water conservation methods.

- Inadequate extension services.

e.g. The need to advise emerging farmers about farming methods, and about administrative procedures involved in applying for a license to use water.

- Empowering and educating the community, especially through women and youth, about better resource use.

e.g. Schools should educate youth about the scarcity of water resources and how they can save water.

- The need for both mutual and professional support.
- Instilling a sense of 'ownership' of resources, and responsibility for their protection.

Technology

- Methods of saving water or using it more efficiently.

e.g. Micro-irrigation techniques .

- Improved farming practices.

e.g. Better stock management to prevent bank erosion.

e.g. More appropriate choice and timing of crops to conserve water.

Once people have expressed their issues and created a collective understanding of each others' and their collective context, they will be ready to start thinking about what a new, better situation may be like and what might be the properties of such a system.

Question: ***2 steps toward the new vision***

Stakeholder A:

1. Proper communication across ALL grass roots structures

   → one voice to government

   (Youth League, Women's League, ANC, SANCO, traditional leaders, farmers)

2. Co-operation between Land Affairs, DWAF, Agric. and Local Government, CPF in administration and financing (also DEAT)

Stakeholder B:

1. **Integrated** development planning and marketing to draw investment

   (*Central CMAs ® local agent; CMAs should have commercial wing*)

2. Clear stepwise process for land acquisition and transfer

Stakeholder C:

1. Community awareness of water shortage

2. Education of youth about water (*Dept of Education)*

3. Both urban & rural areas need to be involved

Stakeholder D/E:

1. Devolve power to CMAs

   from national DWAF
   - Responsible leadership
   - To ensure everyone has (an organized) voice through appropriate forums (WUA's)
   - Effective lines of communication to and from national departments.

2. Active land stewardship

Stakeholder F:

1. CMAs to ensure active and organized local/sub-catchment groups, who understand each other, and develop pride in their resource.

Stakeholder G:

1. Responsibility to integrate land and water admin must be at CMAs level

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Stakeholder H:

1. Participation of civil society (esp. churches and women) in understanding water use and the CMAs
2. Government to deploy MEC's to conduct local water forums
3. CMC's to conduct public awareness workshops and education → next generation (*also education about nature conservation, and using radio and other media*)
4. Bottom-up involvement in policy development
5. Government to speed up land distribution & Land Care

Stakeholder I:

1. Over-all planning – S.E.A. using cost/benefit analyses to enable effective and informed decisions
2. Training for improved resource management
3. Long-term research, sustainability

Stakeholder J:

1. CMC and grass-roots (forum) have **common vision** (everyone's needs) → cascade from general to specific (operable)
2. Determine Reserve and its variability

Stakeholder K:

1. Peace and security for all through affirmative action
2. Root out corruption, nepotism and bribery regardless of who is involved
3. Responsibility for action now, and commitment to finding solutions
4. Share knowledge about how to do it right
5. Tangible benefits delivered to people

The following is a further extract from the workshop process:

A vision for a future system of catchment management

It is clear that we are all trying to find our way in a very complex, evolving and confusing system. The difficulties of trying to deal with this complexity may lead us to focus solely on our own sector's needs and problems. But the catchment and its water resources form one interrelated system and various sectors affect each other's ability to use the resource. We have to work together to avoid and resolve conflicts, and to share the resource in a way that benefits the whole catchment.

The diverse issues that were discussed have also shown that no one is satisfied with the present situation. We all recognize the need for change. In moving our focus from the present to the future we can use our experiences of past and present problems to build a vision for a new system that is better able to deal with these issues. Designing a new system frees us from the constraints of the old management system and the problems it creates.

We all agreed that one of the limitations of the previous management system was that it only made use of a 'top-down' approach – in the future a 'bottom-up' approach should also be followed. This transfer of power to lower levels will require that the 'bottom' takes responsibility for organizing itself so that it can direct higher levels and processes. The 'bottom-up' approach is impossible without organization and action – government can only help us if we are organized to help ourselves.

Discussion of the symptoms and causes of our present problems has helped us to envisage some of the properties of a new system of organization for both 'bottom-up' and 'top-down' management processes. These may be summarized as follows:

A more holistic approach

- All stakeholders need to strive for an understanding of each other's positions, and to co-ordinate their activities toward a common vision for their shared resource.

Greater integration

- Linkages between land and water, upstream and downstream resource use, and social, economic and environmental goals must be created.

Co-operative governance

- There is a need for co-operation between different levels – from individual users to forums, CMCs, the CMAs and DWAF, and from local to national government.
- There is a need for co-operation between different sectors, areas and communities, and between government departments – in particular DWAF, DALA and DEAT.

Equity

- There needs to be more equitable access to resources, and a more equitable distribution of the costs and benefits of resource management. This can only be achieved by a holistic, co-operative and integrated approach.

Efficiency

- The management and administrative process must be efficient in their use of human resources, finance and time.

More informed civil society

- Communities must be empowered to use the system to address their needs.

More adaptive policies and processes

- Management policy and processes must be able to adapt to changing needs, and to improve over time by learning from experience.

As part of the workshop process, stakeholders were taken to a nearby river to consider goods and services and costs and benefits associated with the use of the river resource.

This exercise identified the following areas over which agreement at the broad catchment scale could potentially be reached:

LAND USE

e.g.

- *Healthy banks.*
- *No erosion.*

RIVER USE

e.g.

- *Healthy, beautiful river.*
- *Maintain biodiversity, and use its benefits.*
- *Maintain supply of indigenous fruits, crops and medicines.*
- *Rehabilitation beyond conservation areas.*

DEVELOPMENT

e.g

- *Provide employment that benefits local people.*
- *Provide basic services.*
- *Cultural and recreational tourism development.*
- *Agricultural development.*
- *Using some of the resource's assimilative capacity to support development.*

EQUITY

e.g.

- *Equitable access to the resource.*
- *Equitable distribution of costs and benefits.*

SUSTAINABILITY

e.g.

- *Maintain health of resource, and profitability of economic activities.*
- *Protect our children's heritage.*
- *Environmental capacity known and respected.*
- *Future options not foreclosed.*
- *Transparency and accountability to achieve a sustainable management system.*

These aspects can be drawn together into a statement that reflects the aspirations we share for the future of our resource. A suggested vision or mission statement for our workshop group could thus be as follows:

We are proud custodians of our rivers.
They sustain our economy and heritage.
We protect and manage them so that they can continuously bring benefits equitably to our people, the nation, and our neighbours.

We recognise that such a statement functions mainly to inspire and unite us, rather than to provide the achievable goals that a strategy could be designed to address. A commitment by all stakeholders to a broad vision such as this is however a necessary starting point for building consensus on a more detailed vision or desired state that balances specific sectoral needs.
At these lower levels of detail, the compatibility of different stakeholders' needs and aspirations will become easier to discern and address. This may take place by a process of discussion and negotiation, as well as more technical inputs and processes to optimise overall resource use, and achieve an equitable distribution of costs and benefits.

Stakeholders were asked to identify ways in which they would want to see change in order to support the achievement of the vision. This discussion led to the design of a strategy for action, including the identification of responsibilities. The following is an extract from this exercise:

Strategies for achieving holistic, integrated and co-operative catchment management

It has been recognized that the importance of a 'bottom-up' approach was neglected in the past, resulting in ill-informed 'top-down' policies, which were not responsive to local needs. It is essential that in the future both 'bottom-up' and 'top-down' initiatives work together if effective water resource management is to be achieved.

The catchment has been identified as an important scale at which the future integration and coordination of stakeholder needs and activities must take place. The CMAs, as the 'top' level at this scale, has the important function of maintaining a catchment-wide perspective of resource management issues. This broad scale view is needed in order to develop 'top-down' policy that can ensure the co-ordination and compatibility of local policies and activities at both a catchment and national scale. This perspective must however be properly informed of local needs and activities through effective 'bottom-up' processes initiated at a local level.

There are thus two important levels at which strategies toward the achievement of effective resource management must be initiated:

1. The CMAs, including the CMCs for the various sub-catchments.
2. Local and community-based resource management structures and user forums.

The role of the CMAs

Ideas expressed by the group about the future role of the CMAs, and the principles by which it should operate, can be summarized and organized as follows: (Figure 1)

The CMAs should have clear strategies to address the following areas of concern:

1. Resource allocation and management.
2. Facilitation of development.
3. Ensuring co-operative governance.

Resource allocation and management

- There is a need to address the issue of allocation and re-allocation, in order to create more equitable access to resources, and at the same time protect stakeholders' livelihoods by allowing economic activity to continue.
- Separate strategies are required for the management of consumptive versus non-consumptive use, and the protection and rehabilitation of the resource.
- Incentives such as a system of rewards or penalties should be used to influence the way people use the resource. It should also be recognized that often education, or even disciplinary action, is not effective in discouraging poor resource use. For various socio-economic reasons, viable alternatives to such practices may not exist – management actions should not address symptoms, but causes.

Facilitation of development

- There is a need for long-term assessment (Strategic Environmental Assessment) of the development potential of the resource, in order to optimize future resource use.
- A starting strategy must identify opportunities to use water in facilitating development within the catchment, and employ a marketing strategy to attract investment. This responsibility is shared with lower levels where entrepreneurial activity is more likely to be initiated. The CMAs must provide a facilitatory framework to encourage such local activity.

Co-operative governance

- A commitment to the principle of co-operative governance is not enough. A strategy is needed to establish working links between the various levels and departments.

e.g. DWAF and DALA need to put in place structures and strategies to co-ordinate land and water use.

- There must be clarity on organizational and institutional arrangements at the various levels, eg. CMCs, WUAs, and community forums.
- A system is required for managing information, communicating and promoting co-operation between levels, and conducting appropriate research.
- There is an urgent need for capacity building at all levels.

e.g. Awareness and education campaigns are needed to empower stakeholders to use administrative processes and consult available sources of help.

The role of local and community-based resource management structures

Placing sole responsibility on the CMAs for all aspects of resource management, development facilitation and co-operative governance will merely entrench another 'top-down' approach, in a more localized system. If the voice from the 'bottom' is to be heard and understood it must communicate in a way that facilitates the work of the CMAs. Lower levels need to be organized, and to communicate to upper levels their local commitment and pride – they must create music not noise!

All 'bottom' groups must see themselves as facilitators of their joint work with the CMAs. Our strength is in the strength of others – all levels and groups need to provide each other with mutual support. In order for the overall management system to operate effectively the lower levels must work to the same pattern as higher levels.

The CMAs, and all the other levels of organization within the catchment, such as CMCs, WUAs, community forums, Water Boards, emerging farmers' groups, etc. must share a common understanding of:

- what needs to be done;
- how to approach it;
- who is responsible;
- where and when it should happen.

This will require local level strategies that match those outlined for the CMAs (Figure 1). If a 'bottom-up' approach is to be effective, all local structures must have their own strategic plans for resource allocation and management, facilitation of development and co-operative governance, as well as the more specific strategies by which these main strategies are to be achieved.

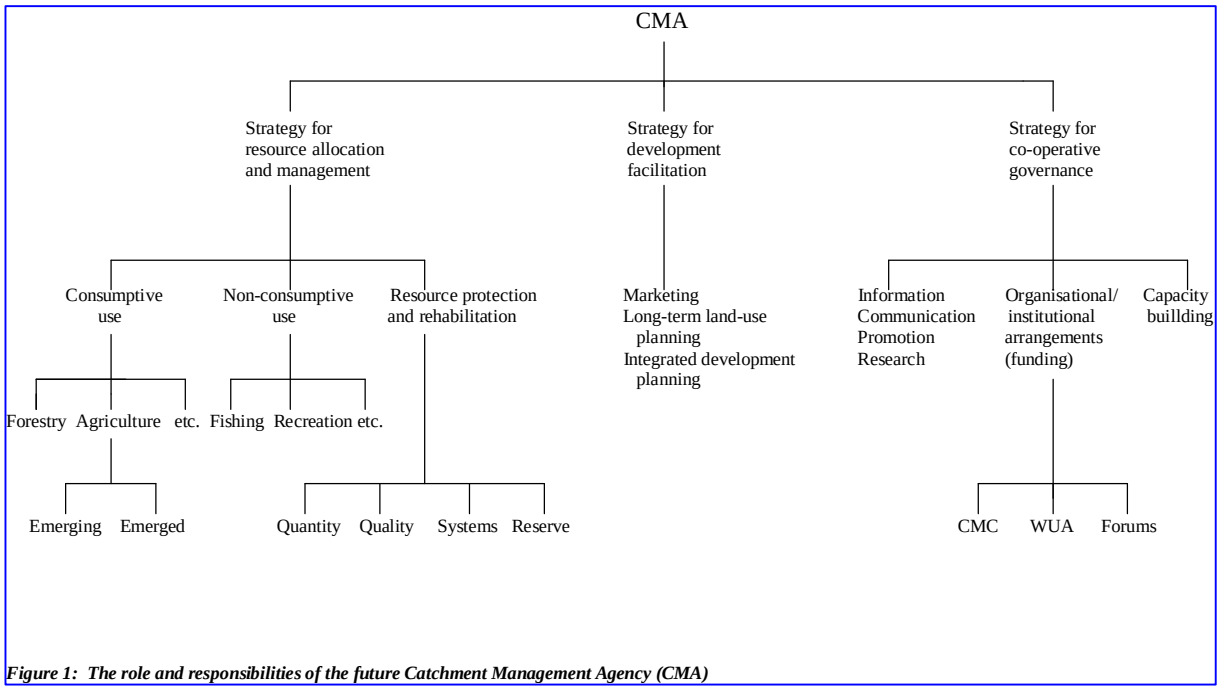

Figure 1: The role and responsibilities of the future Catchment Management Agency (CMA)

Operating principles for a new management system

The vision we generated in the first workshop for the attributes of a future management system can be seen as a set of operating principles to which a CMAs may be expected to commit. All other management levels would then also be required to adopt these principles in planning and carrying out their management activities.

These principles were summarised as follows:

HOLISTIC / INTEGRATED

- *A shared resource requires a common vision and co-ordinated action.*

COOPERATIVE GOVERNANCE

- *Working partnerships must be created both vertically and horizontally.*

EQUITY

- *There should be equity in access to the resource, and in the distribution of costs and benefits.*
- *Revenue should be generated from all who benefit from management of the resource (the river ecosystem) and not just water users. (See Appendix C.)*

EFFICIENCY

- *Management and administration processes should work towards speedy and efficient service delivery.*

EMPOWERING CIVIL SOCIETY

- *Civil society should be informed and active.*
- *The importance of a bottom-up approach, and grass-roots sourcing of issues, must be recognised.*
- *A sense of shared ownership and responsibility must be created.*

ADAPTIVE

- *Policies and process should be able to improve with experience.*
- *The CMAs and all levels of stakeholder representation should be transparent, accountable, and challengeable.*

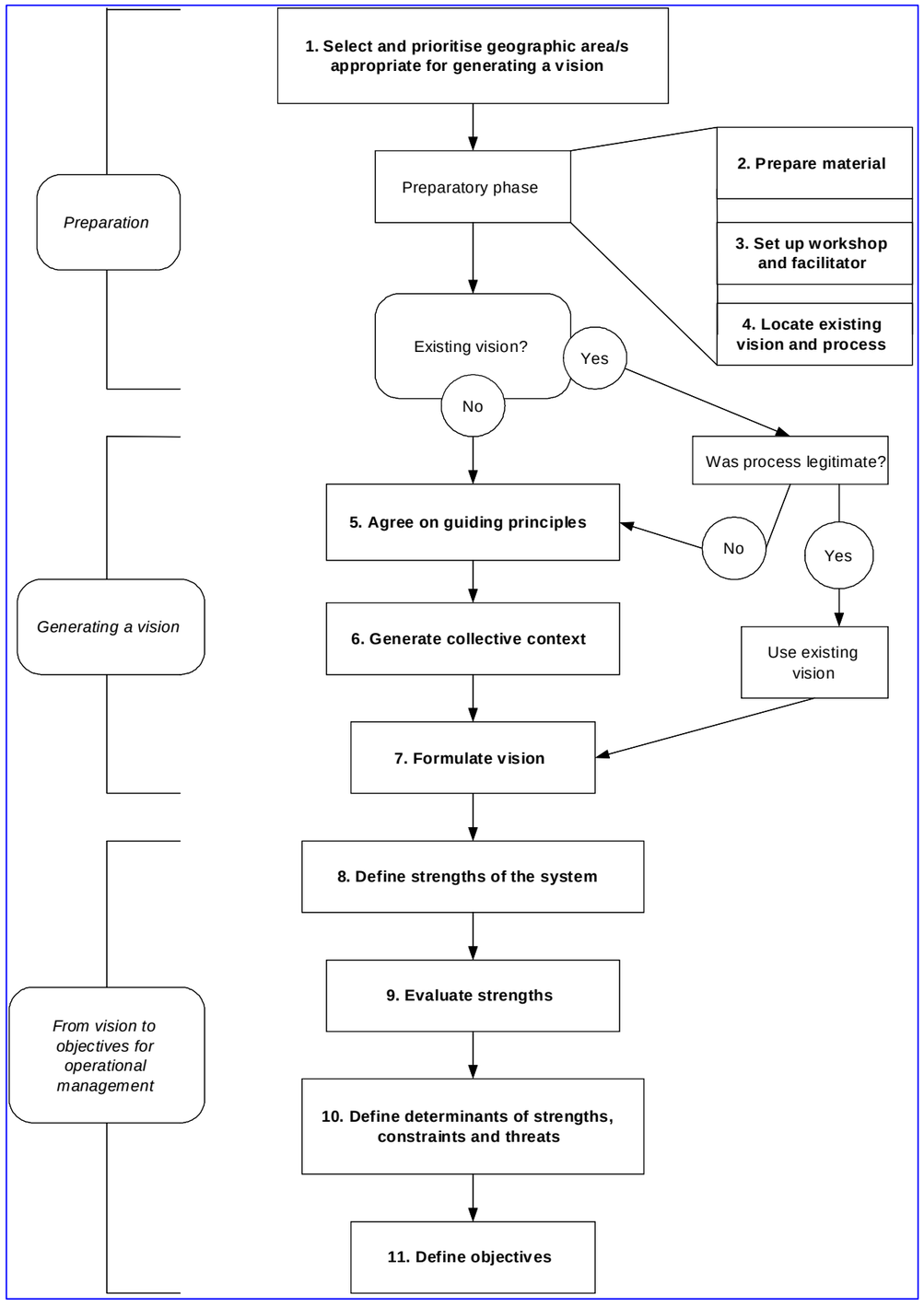

Figure 6.1: A summarised process diagram to show steps in generating a vision and breaking it down into component objectives

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