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National Water Quality Management Framework Policy



Department: Water Affairs and Forestry

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Draft 2

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NATIONAL WATER QUALITY MANAGEMENT FRAMEWORK POLICY



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PREFACE

The "National Water Quality Management Framework Policy" not only builds on the historical policy but also considers, and is aligned to, relevant legislation and policies related to water resource management. The policy is structured in accordance with an accepted international framework related to a management system. Thereby, providing not only more complete operational guidance for the execution of but also improved context and focus to the water quality management function. Specific emphasis on social and economic development considerations in the execution of water quality management related activities are also encompassed in the policy.

The previous documented version of the Department's water quality management policy entitled, "*Water Quality Management Policies and Strategies in the RSA*" was released in 1991. It addressed water quality management requirements at that time and within the prevailing context of evolving economic and socio-political trends. The document was compiled with due consideration to global trends in water quality management as well as to local requirements and experiences. This resulted in an advanced, but pragmatic, approach to water quality management. However, some visionary aspects of this approach suffered from the lack of appropriate regulatory support for early and effective implementation.

The policy guided the evolution of the water quality management focus from primarily an effluent standard approach towards greater emphasis on the receiving water environment. A hierarchical decision-making framework encompassing both of these approaches was central to this policy. The specific actions to improve water quality management as stipulated in the document were largely fulfilled, thereby providing a foundation for further policy enhancement on which the latest policy builds.

The latest policy is aligned with the National Water Act, 1998, which will facilitate effective execution of the policy.

APPROVAL

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In addition to the above, members of the Steering and Stakeholder Committees are also thanked for their input to the policy as reflected in this document.

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EXECUTIVE SUMMARY

1. Policy context

The water quality management framework policy applies to all components of the water resource, that is, watercourses, surface and groundwater bodies, wetlands and estuaries. The policy also covers marine resources in so far as the water quality of these resources could be affected by water use.

Although the various water resource components could have different water quality requirements and associated management approaches, the water quality management policy and the management practices and practices stemming from the implementation of this policy in general, apply to each of these water resource components. For example, the policy for the groundwater strategy will be addressed in a sub-strategies specific to this particular water resource component.

As indicated in the Preface, this policy builds on the Department's water quality management policy entitled, *"Water Quality Management Policies and Strategies in the RSA"* which was released in 1991. This policy is also aligned with related overarching policies and legislation. It takes into consideration not only the latest global trends in water quality management but also the current political, social and economic imperatives of South Africa.

Although the Department of Water Affairs and Forestry took the initiative in the development of this framework policy, it is not proprietary to the Department but is intended to provide guidance across the water sector, especially the water management institutions which, over time, will be more directly involved in the execution of the water quality management function.

2. Water quality management goal

The mission statement related to water resource management emphasise the requirements to conserve, manage and develop the South African water resources in a scientific and environmentally sustainable manner to meet the social and economic needs of the country. The overall water quality management goal is aligned with this perspective and can be defined as follows:

"Achieving water quality that is "fir for use" and maintaining aquatic ecosystem health on a sustainable basis by protecting the country's water resource, in a manner allowing justifiable, social and economic development."

Overall strategies as well as the associated operational strategies as reflected in this policy have been adopted to address the water quality of the country's water resource, leading to long-term sustainable water use. Aiding social and economic development is encompassed in these strategies, addressing these matters at multiple levels in the execution of the water quality management function.

The efforts in aiding social and economic development could be summarised as follows:

- Creation of conditions conducive to social and economic development by attaining water of suitable quality for use
- Assisting in the improvement of the productivity of the South African economy by means of the introduction of measures to liberate economic resources to be applied elsewhere in the economy

• Distribution of benefits derived from large-scale water use into the local economy.

3. Water quality management strategies

Attainment of the adopted water quality management goal requires the implementation and execution of core and associated cross-cutting strategies.

3.1 Core strategies

The core strategies which are key to giving effect to the water quality management policy are as follows:

• Establishment and enhancement of the key aspects that underpin sustainable water use.

Sustainable water use is recognised as the ultimate aim of water resource management. Sustainable water use is also regarded in a combination with a number of other factors as supportive of sustainable development. This strategy addresses specific measures at international, national, regional and local scales to give practical effect to the achievement of sustainable water use. These measures are inter-related and have bearing throughout the water quality management policy and the related execution of the water quality management function.

• Maintenance and improvement of the quality of the country's water resource.

Increased competition for the use of a limited resource places stress on the resource. This reduces its ability to support consumptive and non-consumptive uses as well as to threaten the security of supply.

The strategy is deployed within an adopted framework, encompassing source-directed, resource-directed and remediation-directed measures.

3.2 Cross cutting strategies

Cross-cutting strategies to support the core strategies adopted for water quality management will be developed for implementation as dictated by need. Cross-cutting strategies already adopted are as follows:

• Creation and maintenance of partnerships with outside parties who could aid the water quality management effort.

The partnership strategy is a logical enhancement of the current somewhat *ad hoc* utilisation of support by outside parties towards the water quality management effort. Partnerships at various levels within the execution of the water quality management function are identified to aid its execution.

• Communication with stakeholders to create awareness of the water resource and the factors affecting it and its management.

Initially, this strategy will convey information on the water resource and associated water quality matters. The initial effort will be followed by motivational information to aid in the change of perceptions, attitudes and behaviour.

• Building capacity of stakeholders to contribute meaningfully towards water resource management.

Specific capacity building approaches will be encompassed in the respective sub-strategies to be developed and implemented as part of the execution of the water quality management function. The national strategy for dense settlements, forming part of the source-directed strategy, is a typical example of addressing the capacity building requirements of local communities and local government. Initially and whilst the other adopted strategies are being implemented, the communication strategy will be key to facilitating capacity building. Once these strategies are fully implemented, they should assist significantly towards capacity building, providing a collective effort in this regard. Nevertheless, it is foreseen that the communication and capacity building strategies will always be supportive of each other.

4. Operational strategies

Key operational strategies required for the implementation and execution of the adopted water quality management strategies include:

- Implementation of water quality management planning as a dedicated function within the overall water quality management function. The development and maintenance of a national water quality improvement schedule has already been identified as a requirement of this planning.
- Revision of the hierarchical decision-making framework related to water use authorisations included in the 1991 water quality management policy document. This framework has been expanded to allow for short-term water quality degradation under deserving social and/or economic situations. Specific checks have been encompassed in the policy to guide these situations, neither causing serious and/or irreversible water resource impairment nor jeopardising human health.
- Employment of water use charges to correct the bias caused by under-pricing and the possible associated over-use of the water resource. Such economic instruments will also be used to raise the economic value of water quality related water use to the same level as the water quantity related water use.
- Application of compulsory licensing for those water resources identified as requiring water quality improvement. Guidance will be provided on those water resources for which compulsory licensing will apply.
- Application of voluntary approaches to enhance and guide partnership arrangements into coherent mechanisms in support of the water quality management effort.
- Improvement of co-operative governance between government departments, water management institutions and stakeholders in general by addressing this aspect at strategic and operational levels as related to internal and external interactions. The organisational design envisaged by the Department of Water Affairs and Forestry is also related to this matter.
- The enhancement of Department of Water Affairs and Forestry's capacity. This will require training and re-skilling of personnel to be equipped for the execution of the changing water quality management function.
- Facilitating appropriate research and development to support the water quality management effort.
- Facilitating appropriate technology development to support the water analysis management effort.

- Enhanced information management by improving the Department of Water Affairs and Forestry's water quality management system and by making information on water quality related matters available to outside parties.
- Continue with the processes of stakeholder consultation which already forms part of water quality management. Shortcomings in processes will be addressed.

In addition to the above, consideration will be given to develop a strategy specifically aimed at promoting social and economic development within the context of water quality management.

5. Operational instruments

Operational instruments, such as signalling mechanisms and voluntary approaches, have been identified to aid with the execution of the water quality management function. These instruments are not only aimed at changing the behaviour of water users but also at providing mechanisms for engaging outside parties in the water quality management effort.

6. Policy monitoring and auditing

The policy allows for enhanced monitoring and auditing systems to be implemented to check on policy performance in the attainment of the stated water quality management goal.

7. Conclusion

The policy aims to address implementation and execution of water quality management in its fullest context by considering all the components comprising water quality management at relevant strategic and operational levels. This should significantly enhance the guidance offered by this policy to the various operational focus levels within the water quality management function and also aid in correcting historical biases in the execution of this function.

Due to the manner in which water quality management was conducted in the past, some management components received more attention than others. Effective policy implementation will require that this attention be at least maintained, with the lagging components being elevated to the same level of management effort and focus. Moreover, it must be recognised that effective water quality management will become more economic and human resource-intensive and that harnessing the water use constituency to fulfil some water quality management functions is inevitable. Forming partnerships with all levels of stakeholder and water user are key to promoting sustainable water use into the future.

The water quality management policy described in this document is aligned to current legislation in general and the National Water Act of 1998 provides a firm base for the policy's implementation. A number of actions required for the implementation of the policy have been identified and listed in this document.

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DEPARTMENT OF WATER AFFAIRS AND FORESTRY

NATIONAL WATER QUALITY MANAGEMENT FRAMEWORK POLICY

DRAFT 2

1 INTRODUCTION

Water quality management is being practised under ever-increasing pressure on the country's water resources. Population growth and economic development go hand-in-hand with increased water demand and water pollution. The situation is compounded by the existence of distinctly different hydro-meteorological areas in the country as well as different levels of socio-economic development, water resource development and water resource protection requirements. In addition, changes in legislation and national priorities over time require continuous adaptation and improvement of the manner in which water quality is managed by the Department.

Water quality management primarily relates to the assessment of the status of the country's water resources, devising an implementation of strategies and plans of various natures and at various levels to ensure that the water qualities of these resources meet the requirements of recognised water users. Remediation of water resources are facilitated if considered to meet this requirement. Control over water use is exercised by means of authorisation and/or related mechanisms if compliant with adopted criteria.

The water quality management function forms part of the water resource management function, which is undergoing significant change in the medium term to align it with overall policy and with legislation. Water quality management policy is being adapted in tandem and to inform water resource management policy. Hence, the water quality management framework policy can be regarded as dualistic in purpose, providing both guidance to the overarching water resources policy and the framework for the development and implementation of lower order policies specific to water quality management.

The water quality management policy reflected in this document concurs fundamentally with and endorses the 1991 policy. The latest policy is a refinement of previous policy, retaining the philosophical base created by previous policy. The development of this policy endeavoured to provide guidance at all operational levels within the water quality management system, especially also to address social and economic considerations.

The latest policy is also aligned with other guiding legislation and policies. It takes into consideration not only the latest global trends in water quality management but also the current political, social and economic imperatives of South Africa. The National Water Act, 1998, provides a firm base for its implementation.

Although the Department of Water Affairs and Forestry took the initiative to the development of this framework policy, it is not proprietary to the Department but is intended to provide guidance across the water sector, especially to water management institutions which, over time, could be more directly involved in the execution of the water quality management function.

However, it should be recognised that the Department of Water Affairs and Forestry is mandated by legislation as the custodian of the country's water resource and is compelled by virtue of this responsibility to continually fulfil a lead agent role in this regard. Hence, the ultimate accountability of the country's water resources remains with the Department.

2 POLICY GOALS AND APPLICATION OF POLICY

The policy is defined in terms of an accepted international framework related to a management system, at an overall guidance level related to water quality management.

In terms of the adopted framework, it encompasses a water management goal and associated strategies for attainment of this goal. Operational strategies and instruments to effect implementation and execution of the adopted strategies are also described. This policy concludes with the defining of monitoring and auditing systems to access policy implementation and execution.

The policy is defined, implemented and executed within a recognised value framework covering social, economic and accepted water quality management principles and associated key success factors.

Within the above policy definition, the purpose of the water quality management framework policy is to:

- Align water quality management policy with current legislation and relevant overarching policies.
- Provide guidance on sustainable water use, especially as far as it relates to water quality management.
- Stipulate strategies as well as associated regulatory and economic instruments to attain the Department's overall water quality management goals.
- Inform the water resource management function as well as the required framework for the development of related policies and sub-strategies related to water quality management.
- Address operational aspects such as decision-making in the execution of the water quality management function.
- Provide resolution on matters related to water quality management that are not adequately addressed in current policy.
- Guide further development of legislative instruments and measures.

The water quality management policy applies to all components of the water resource (eg, watercourses, surface and groundwater bodies, wetlands and estuaries). The policy also covers marine resources in so far as the water quality of these resources could be affected by water use. Specific arrangements between the Department and the Department of Environmental Affairs and Tourism will be put in place in order to manage the interface of responsibilities in this regard.

Although the various water resource components could have different water quality characteristics and associated management approaches, the water quality management policy and the management strategies and practices stemming from the implementation of this policy in general, apply to each of these water resource components. Where justified and for specific water resource components, the policy will be adapted and described in sub-strategies specific to those water resource components (eg, the groundwater strategy). Specific refinements to the adopted strategies, such as the partnership strategy, could also be required, ensuring that these are relevant for ongoing assistance to the water quality management function.

Water quality management is exercised within the context of devolution of responsibility. The Department is gradually adapting its water resource management approach to place greater emphasis on policy development and execution, strategic planning, overall regulator oversight, institution support, coordination in aid of enhanced co-operation governance and regulatory control. This shifting emphasis allows for greater involvement of water management institutions and other role players within the water sector to primarily be the operational aspects of water resource management.

Water quality management as addressed by this policy is mainly concerned with the physical, chemical and biological attributes of water quality. However, due to the integrated nature and associated holistic views on water resource management, this policy recognises and considers, where required, other associated water resource attributes. This is very real at the operational level in setting of resource quality objectives derived from the environmental values, which include social and economic consideration imposed on a water resource. In this regard, physical and chemical water quality are regarded as only one part of the overall suite of attributes requiring attention for successful water resource management.

The policy is stated at an overall guidance level only and attention is required to expand and develop specific aspects of the policy for operational implementation as outlined in **Section 13**.

3 OVERALL GUIDANCE TO POLICY

Policy development is guided by global trends in water resource and water quality management as well as South African legislation, policy and institutional arrangements. These considerations are addressed in this section to create the required context for the framework policy at these two levels.

3.1 Global context

3.1.1 Sustainability in water resource management

The concept of sustainable development provides philosophical guidance for water resource management. This concept involves ecological, economic and social considerations as three components within a single system in which a disturbance to one will affect the others. This perspective does not imply a static view of the components of the system or of their interactions with one another. On the contrary, it allows for change in the nature of each of the components and for various equilibrium states.

The natural and human environments are not only interdependent but constitute a range of choices to society to determine the nature of the desired equilibrium state. However, uncertainty in ascertaining what constitutes a true equilibrium state and the general preference of society to conserve the natural environment while maintaining economic and social development, are factors to be taken into account in arriving at any such balance. The costs and benefits flowing from any potential trade-off must be explicit and should be considered by society, but also taking account of the socio-economic adjustments required in South Africa in the short term.

3.1.2 Global trends related to water quality management

An assessment of water quality management policies in developed countries indicates that the overarching strategies for water quality management have largely been established, but some refinement is still taking place. Overarching strategies invariably encompass control of pollution at the source, within the context of water resource management on a regional basis (ie, watersheds, catchments, impoundments).

Refinement primarily concentrates on the creation of enabling environments for the implementation of legislation and policies. This applies to both the water user and the regulator. Both institutional arrangements and operational instruments are taken into account. These vary from rule-based best management practice measures, guidelines and manuals to more indirect guidance to water users, such as compliance assistance and creating partnerships with water management institutions and other stakeholders. Much of the success in water quality improvement is associated with the additional dimension brought to routine water quality management by partnerships. In addition to delegating responsibilities, outreach programmes are conducted to create awareness and to foster stewardship of the water resource. Management of externalities and the application of these as signalling mechanisms towards stewardship are also at the forefront of global trends.

The global dimension of environmental effects and the necessity of aligning national policy with the global framework must be recognised. Most countries endorse the concept of ecologically sustainable development, thereby acknowledging the need to maintain integrity of the water resource in order to make the continued production of goods and services possible. For the concept of sustainable development to be turned into practice, it must be encompassed in policy. Policies are aimed at developing strong, growing and diversified economies, which can enhance the capacity for environmental protection whilst maintaining international competition. Sustainable rural and regional growth are also provided for in these policies.

Assessment of the benefit to society arising from policy and legislation is becoming a routine activity. Cost-benefit analysis and cost-effective analysis are typical examples of assessing regulatory intrusiveness.

Community and stakeholder involvement in water resource issues that affect them has become common practice in developed countries.

Evidence indicates that water quality management in developing countries is still evolving. In many of these countries, water quality management is not afforded high priority, although there is a growing recognition that water is a social and economic good with a vital role in the satisfaction of basic human needs, food security, poverty alleviation and the maintenance of ecosystems. Hence, the conception of water as a low-value commodity appears to be gradually fading.

Developing countries often adopt components of developed country strategies. This sometimes leads to unrealistic water quality management goals and approaches that are not balanced with their capacity for effective implementation.

3.2 South African context

3.2.1 Regulatory and overarching policy

Overall guidance on water quality management has evolved in nature and in stature during recent years. This guidance framework encourages and/or demands attention and action with respect to specific aspects. The most notable guidance is provided by the Constitution, 1996; National Environmental Management Act, 1998 (NEMA); the National Water Policy; and the National Water Act, 1998. The Water Services Act, 1997 and the White Paper on Integrated Pollution and Waste Management and other related legislation as listed in this section are also considered in this policy.

3.2.1.1 Constitution of the Republic of South Africa, 1996

The Constitution caused a paradigm shift in South African environmental policy by providing a right to "an environment that is not harmful to human health or wellbeing", and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures. These measures relate to the prevention of pollution and ecological degradation, the promotion of conservation, securing ecologically sustainable development and the utilisation of natural resources while promoting justifiable economic and social development. The constitution also calls on effective, transparent, accountable and coherent government in a manner that does not encroach on the geographic, functional and institutional integrity of other spheres of government.

3.2.1.2 National Environmental Management Act, 1998

The National Environmental Management Act, 1998, gives legal effect to the internationally agreed principle of sustainable development. This aspect must be taken into consideration in all decisions that may affect the environment. In addition, the Act also provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote environmental governance and procedures for co-ordinating environmental management functions.

3.2.1.3 National Water Act, 1998

The National Water Act, 1998, is the primary statute, providing the legal basis for realising South Africa's water quality management policy.

The Act stipulates that the water resource of the country is a national asset for which the National Government must act as public trustee. The water resource must be managed to achieve sustainable water use for the benefit of all users. The use of the water resource in a manner that meets basic human needs and provides for ecologically sustainable development, is enshrined in the Reserve, which enjoys priority by right.

The Act also requires protection of the quality of the water resource as well as integrated management of all aspects of the water resource. Participation of everyone in the management of the water resource must be promoted by the delegation of management functions to regional and catchment levels. In the management of the water resource, cognisance must be taken of international requirements.

3.2.1.4 National Water Policy

The National Water Policy for South Africa has been translated into 28 fundamental principles. These principles have a bearing on water quality management policy as related to sustainable water use for social and economic benefit; maintenance of the ecological functions of the water resource on which humans depend; equitable access of all user sectors of water to desired quality; and integrated management of water quality and quantity in a manner consistent with broader environmental management approaches. The principles require the delegation of water resource management to catchment level for greater participation in the management of the water resource.

3.2.1.5 Other legislation and policy

In the formulation of the National Water Quality Management Framework Policy, consideration was also given to the following legislation and overarching policy:

- Environment Conservation Act, 1989
- Minerals Act, 1991
- Access to Information Act, 2000
- Administrative Justice Act, 2000
- Water Services Act, 1997
- White Paper on Integrated Pollution and Waste Management.

3.2.2 South African government framework

Government is constituted as national, provincial and local spheres of government. According to the Constitution, these spheres are distinctive, interdependent and interrelated. Each sphere contains different organs of state necessary for government to fulfil its obligations.

Organisations exercising public powers or performing public functions in terms of legislation are also organs of state, although they do not form part of any sphere of the government. Examples of these are the Catchment Management Agencies and the Water Tribunal. Water User Associations could also be represented on these structures.

The different spheres of government and the organs of state within each sphere may only exercise powers and perform functions conferred upon them. As the policies and activities of one sphere of government or organ may impact on the responsibilities and functioning of another, they are required to follow the principles of co-operative governance and intergovernmental relations as set out in the Constitution.

Executive authority is bestowed on each of the three spheres of government. The executive authority constitutes the authority to implement laws and to exercise the powers conferred by those laws.

Intervention in the executive powers of the provincial and local spheres of government may take place in terms of the Constitution. Executive power of intervention is stipulated in terms of specific laws.

3.2.3 Devolution of responsibility (duties and powers)

The water resource management policy has become more people-centred and allows for greater participation by parties involved in water resource management. This shift is effected by the devolution of responsibility to the water user through water management institution such as Catchment Management Agencies and Water User Associations for the planning, management, decision-making and administration related to the water resource on which they depend. Non-statutory bodies, such as public forums, will also be involved in the devolved water quality management function.

Concurrent with the devolution of responsibility, the Department of Water Affairs and Forestry is gradually adapting its water resource management approach to place greater emphasis on policy development and execution, strategic planning, overall regulatory oversight, institutional support, co-ordination in aid of enhanced co-operative governance, regulatory control as well as aiding with social and economic development. Concurrent with this shift in emphasis allowance is made for greater involvement of water management institution and other role players within the water sector in the operational aspects of water resource management.

Overall accountability for the welfare of the country's water resource remains with the Department of Water Affairs and Forestry.

4 WATER QUALITY MANAGEMENT GOAL AND MANAGEMENT PHILOSOPHY

4.1 Water quality management goal

The mission statement related to water resource management emphasise the requirements to conserve, manage and develop the South African water resources in a scientific and environmentally sustainable manner to meet the social and economic needs of the country. The overall water quality management goal is aligned with this perspective and is defined as follows:

"Achieving water quality that is fit for use and maintaining aquatic ecosystem health on a sustainable basis by protecting the country's water resources in a manner allowing justifiable social and economic development."

Overall strategies as well as the associated operational strategies as reflected in this policy have been adopted to address the water quality of the country's water resource, leading to long-term sustainable water use. Aiding social and economic development is encompassed in these strategies, addressing these matters at multiple levels in the execution of the water quality management function. Illumination of social and economic development within the context of water quality management is given in **Sections 8.6, 8.7** and 8.8.

The efforts in aiding social and economic development could be summarised as follows:

- Creation of the conditions conducive to social and economic development. This
 primarily relates to attaining water of suitable quality at the right places and cost
 associated with its use. This could also relate to short-term degradation or longterm improvement in the quality of the water resource to cater for deserving
 environmental value considerations. Creation of conducive conditions will also
 be applied at a practical level for example addressing the following:
 - empowerment and/or informing of representative community associations administering a local water resource. This could include training in administration as well as guidelines to explore development opportunities
 - Assessment related to the efficiency of water use for social requirements including exploitation of development opportunities
 - Identification and prioritisation of areas requiring special attention to redress past imbalances and to stimulate water related/dependent development in specific areas of latent potential
- Assisting with the improvement of the productivity of the South African economy. These relate to efforts to gradually allow water use to be determined by market forces, utilisation of advanced assessment methodologies leading to better effort and economic resource application, creation of partnerships with the water use constituency thereby not only sharing the water quality management effort but also allowing related functions to be executed at a level where it can be done more effectively as well as the phasing out of sectoral discrepancies.
- Distribution of benefits derived from water use. In the process of water use authorisation, the manner in which the benefits derived from large-scale water use are routed back into the local economy and applied towards social and

economic development will receive special attention. The derived benefits can be used to aid programmes and projects aimed at social and economic development but also to remediate the adverse effects of impaired water quality arising from the implementation of such programmes and projects.

4.2 Water quality management philosophy

Water quality management relates to the entire water cycle. Hence, effective water quality management requires consideration of all the water cycle components as well as the involvement of all those whose water use and/or associated development could affect the water resource. The management process inclusive of all water sector role players must be credible and robust, providing for flexible responses to local circumstances without losing coherence and direction at the regional and national levels. Stakeholders will be involved throughout this process, harnessing the dynamics and benefits of inter-active involvement, developing greater awareness and mutual understanding and building lasting partnerships and relationships. The Department has the role and responsibility as the final decision-maker, with overall accountability for the country's water resource, aligned to the national vision of natural resource management.

With sustainable water use as the desired outcome of water quality management, the required goal for the quality of the country's water resource is, at minimum, its maintenance but preferably its improvement. However, allowing for short-term degradation in water quality to aid deserving social and economic situations.

The application of precautionary environmental protection, involving action to avert danger or to minimise risk to the water resource, has high priority and finds application at all levels within the water quality management effort. Internalisation of this concept within the processes forming part of the water quality management function, must be continued, thereby assisting in the consistent execution of this function.

It must be recognised in an on-going, pragmatic manner that degradation of the quality of the water resource constitutes an erosion of the national asset base. Addressing of this situation will only find lasting cure if care for the country's water resource is realised in an environmental value (ethos) cherished at all levels within the national society.

In pursuit of the overall water quality management goal, water resource use opportunities could be opened or closed. Given the diverse circumstances, social and economic opportunities and community priorities, the implementation of this policy must be pragmatic, flexible and receptive to outside ideas. For the water resource to be of economic and social benefit within the overall requirement of lasting beneficial use, cognisance must be taken of circumstances and opportunities in each particular case.

5 WATER QUALITY MANAGEMENT STRATEGIES

The water quality management effort is reliant on the implementation and execution of the adopted inter-related (and also mutually supportive) core, cross-cutting and operational strategies as listed in this chapter. The adopted strategies are merely listed in this section and they are described in more detail in subsequent sections.

5.1 Core strategies

The core strategies which are key to giving effect to the water quality management policy are as follows:

Establishment and enhancement of the key aspects that underpin sustainable water use

Sustainable water use is recognised as the ultimate aim of water resource management. The strategy addresses specific measures at international, national, regional and local scales to give practical effect to the attainment of sustainable water use. These measures are inter-related and have bearing throughout the water quality management policy and the related execution of the water quality management function.

Maintenance and improvement of the quality of the country's water resource

Increased competition for the use of the country's limited water resource places stress on the resource. This reduces the ability to support consumptive and non-consumptive water uses as well as to threaten the security of supply.

The strategy is devised within an adopted framework, encompassing sourcedirected, resource-directed and remediation-directed measures.

5.2 Cross-cutting strategies

Cross-cutting strategies to support the core strategies adopted for water quality management will be developed for implementation as dictated by need. Cross-cutting strategies already adopted are as follows:

• Creation and maintenance of partnerships with outside parties who could aid the water quality management effort.

The partnership strategy is a logical enhancement of the current somewhat *ad hoc* utilisation of support by outside parties within the water quality management effort. Partnerships at various levels within the execution of the water quality management function are identified to aid its execution.

• Communication with stakeholders to create awareness of the water resource and the factors affecting it and its management.

Initially, this strategy will convey information on the water resource and associated water quality matters. The initial effort will be followed by motivational information to assist in the change of perceptions, attitudes and behaviour.

• Building capacity of stakeholders to contribute meaningfully towards water resource management.

Specific capacity building approaches will be encompassed in the respective substrategies to be developed and implemented as part of the execution of the water quality management function. The national strategy for dense settlements, forming part of the source-directed strategy, is a typical example of addressing the capacity building requirements of local communities and local government. Initially and whilst the other adopted strategies are being implemented, the communication strategy will be key to facilitating capacity building. Once these strategies are fully implemented, they should assist significantly towards capacity building, providing a collective effort in this regard. Nevertheless, it is foreseen that the communication and capacity building strategies will always be supportive of each other.

5.3 **Operational strategies**

The operational strategies encompassed in this policy are the following:

- Water quality planning
- Decision-making in water quality management
- Water use charges and related mechanisms
- Influencing land use
- Compulsory licensing
- Co-operative governance
- Departmental capacity enhancement
- Organisational design
- Enforcement
- Conflict resolution
- Research and development
- Technology development
- Information management
- Stakeholder consultation.

Consideration will be given whether the above operational strategies should be augmented with strategies specifically aimed at promoting social and economic development with the context of water quality management. This could include the establishment of a coordinating body to facilitate the identification and implementation of water related social and economic development to ensure that with the execution of the water quality management function social and economic obligations are adequately addressed.

6 CORE STRATEGIES

The core strategies are addressed where applicable at various levels not only to aid in full understanding of the respective concepts, but also to ensure that the policy is comprehensive in providing guidance at those levels at which water quality management is operationally effected.

6.1 Strategy to establish and enhance the key aspects underpinning sustainable water use

6.1.1 International scale

Sustainable water use is aligned with the Government's national goal of sustainable development, placing the country in step with the international trend in this regard. In support of the objectives of sustainable development, the Government has adopted and advocates implementation of the following:

- Adoption of globally acceptable environmental and social values
- Reflection of the adopted values in political decision-making based on sound understanding and information
- Implementation of globally acceptable environmental and social best management practice measures
- Promotion of innovation in technology and approaches to underpin sustainable growth
- Application of the precautionary principle.

Within this dimension, water quality management must not only be guided by global development but the management effort must also contribute by adding the perspectives and aspirations of developing countries, especially those within the African region.

South Africa has increased its involvement in the international arena of sustainable development. Within the southern African region, South Africa is taking a leading role or participating in many sustainable development initiatives such as the Global Water Project, the State of the Environment Reporting Programme and the SADC Protocol on Shared Water Course Systems.

The international signals on sustainable development will receive continuous attention for guidance on sustainable water use and policies will be revised and/or adapted as required to take cognisance of this guidance.

6.1.2 National scale

Within the national dimension, the water quality management effort will be directed primarily towards making national decision-makers aware that care for the country's water resources is not an externality and cannot be accommodated as an add-on to conventional development and/or policies having the potential to affect the water resource. Development and related policy implementation must be aligned with the requirement of maintaining the productivity and viability of the country's water resources and associated ecosystem functioning. Hence, the water quality management effort will endeavour to elevate water resource protection to the same level and consideration as Government's other national priorities such as economic growth and redistribution, democratic empowerment, poverty eradication and rural development. This effort will also involve demonstrating that water resource management must be integrated into the national economy, recognising the vital role of water for the satisfaction of basic human needs, provision of food and security, poverty alleviation and ecosystem maintenance.

A number of specific actions have already been identified to spearhead the effort to ensure sustainable water use at a national level. These relate to co-operative governance which will be refined and implemented as part of the operational execution of the water quality management function. A high level steering group will be established to guide overall policy implementation. This group will also interface with and convey the relevant water quality management requirements to cabinet and legislative committees dealing with national economic policy and planning and key sectoral and international policies.

6.1.3 Regional scale

The current processes for the development of catchment management strategies and associated plans are adequate to address sustainable water use at a regional level. These strategies and plans will provide the mechanisms for balancing environmental values and the eventual translation of these into resource quality objectives. In the quest for an appropriate balance amongst various requirements, it must be ensured that the following issues receive due consideration:

- Ecological, social and economic importance of the water resource
- Promotion of regional economic stability by enhancing efficient use of public and private economic resources and equitable distribution of costs and benefits
- Facilitation of development opportunities associated with water utilisation
- Enhancement of social benefits and quality of life
- International water quality requirements.

Deliberating and balancing trade-offs with respect to environmental values will be effected by bringing stakeholders together in decision-making processes, allowing views to be heard and considered in the development and implementation of catchment management strategies. The debate within decision-making processes will be open and transparent, with stakeholders having full access to water resource related information.

6.1.4 Local scale

Efforts to establish those measures underpinning sustainable water use at a local level must be aimed primarily at the creation of stewardship of the water resource by individual water users and/or communities interacting with the local water resource.

Initially, local stakeholders will be led towards stewardship and empowered to fulfil this role primarily by means of the Department's communication strategy with

external stakeholders. It is foreseen that the other adopted strategies will also assist as these are implemented.

This effort should be aimed at providing information broader than only normal water resource functioning, but will assist stakeholders with the capacity to fulfil a meaningful and lasting stewardship role. This will, *inter alia,* involve providing them with information to understand the "cause-and-effect" relationship related to water resource impairment, making them aware of the value of water and encouraging them to take responsibility for the manner in which water is utilised.

Experience indicates that the basis and extent of threats to the water resource could be readily grasped at a local level if linkages between individual community behaviour and water resource impairment are clearly communicated and explained.

Moreover, local stakeholders must also be encouraged to become involved in problem identification and problem solving, recognising the strong link between the level of community understanding and the importance given to engaging them in water resource protection measures. As their empowerment progresses, local stakeholders should become more aware of the importance of involvement in the management of their own water resources.

Regarding industry, business and other larger-scale water users, stewardship must include accepting responsibility for and exercising control over their practices, processes and products in order to limit externalities. Equally, local communities must address those matters pertaining to sustainable community functioning. Stewardship also calls for consideration and co-operation between water users. A stable production and marketing environment for industry and business is most likely to occur when industry and the community have common interests. Responsible and responsive water resource use practices must be integral to that coincidence of interest.

6.2 Strategy to maintain and improve the quality of the country's water resource

The execution of this strategy will be primarily conducted within an adopted framework, which will provide much-needed focus and direction of effort towards effective water quality management. The framework comprises the following interrelated measures:

- Source-directed
- Resource-directed
- Remediation-directed.

6.2.1 Source-directed measures

Source-directed measures are imposed on water use in order to protect, conserve, utilise and develop the water resource. Standards to regulate the quality of waste discharge, hazardous substance elimination, cleaner production, cleaner technology and continual improvement are all considered in the formulation and setting of source-directed measures. Taking cognisance of the requirements of precautionary environmental protection is key to setting source-directed measures.

Source directed measures are categorised as follows:

- **Best management practice measures:** These relate to those measures which apply to water use nationally
- **Special measures:** These relate to source-related requirements dictated by and/or derived from catchment management strategies and/or plans
- **Site-specific measures:** These relate to measures stemming from the authorisation process, taking cognisance, *inter alia*, of general authorisations stipulated at national or regional levels and/or considerations specific to the water use being considered.

Experience indicates that the development and implementation of best management practice measures appropriate to South Africa are generally time consuming. An adequate portfolio of best management practice measures could therefore be some time away and, in its absence, the Department will employ existing, albeit dated, measures. These relate primarily to standards to regulate the quality of waste discharges and requirements to minimise the adverse effects of water use.

Additional source-directed measures have been identified and are currently being refined for implementation. These include waste discharge charges, hazardous substance elimination (including a priority list of unacceptable chemical compounds/constituents), stormwater quality control, cleaner production, cleaner technologies, sectoral standards of best management practices and continuous improvement. Aspects which will receive attention in future includes non-point sources of pollution as well as the evaporation and irrigation of effluent.

Prioritisation of not only the development and implementation but also the revision of source-directed measures will be mostly dictated by signals arising from the implementation of catchment management strategies and/or overall long-term water quality planning.

6.2.2 Resource-directed measures

Resource-directed measures are focused on the health of the water resource. Generally, these measures will apply at the following levels:

- National
- Catchment.

6.2.2.1 National scale

Resource-directed measures at this level are primarily aimed at maintaining and improving the overall quality of the water resource, identification of water resource components requiring attention and providing specific actions to aid with the long-term well-being of the water resource. Specific actions at this level requiring attention within the execution of the water quality management function include:

- Benchmarking of water resource quality
- Identification of emerging threats to the water resource and prioritisation for action

• Informing on priorities and focus for source-directed measures.

6.2.2.2 Catchment scale

Resource-directed measures at this level are aimed at giving effect to the environmental values adopted for a water resource. They will be applied on a catchment basis within Water Management Areas. Practical effect will be given by the collective application of resource-directed measures, which encompass resource classification, reserve determination and the setting of resource quality objectives, and water quality specific measures, formulation of source management objectives and associated single source interventions and the formulated water quality management strategies and associated water quality management plans. Their joint application will ultimately culminate in a coherent and implementable catchment management strategy.

In the identification and consideration of environmental values and eventual translation of these into resource quality objectives, the following recognised water users will be considered:

- Aquatic ecosystems
- Basic human needs
- Domestic water supply
- Agriculture
- Industry
- Recreation.

The priority right of water use is conferred upon basic human needs and the aquatic ecosystem by virtue of the Reserve. Hence, in the execution of the water quality management function, the water quality requirements for basic human needs and the aquatic ecosystem will receive priority.

As part of the water quality management function, the Department in cooperation with other agencies are currently actively involved in the development and implementation (on a pilot basis) of catchment management strategies and associated catchment management plans. The experience gained will guide the development of other catchment management strategies as well as the revision of those strategies already in place.

In order to address social and economic considerations which in the past may not has received equal prominence as direct water quality related matters, the following will receive specific attention in the catchment management plans:

• Social considerations

- identification of needs related to water and the current level of water usage at all income levels
- ability to pay for water to meet identified needs
- identification and addressing of water resources with particular social value, such as sacred, religious or historical sites

 representative levels of all groupings in water management institutions and the ability of these groupings to contribute meaningfully to the functioning of these institutions.

• Economic considerations

- identification of current levels of water use and development opportunities arising from water use
- comparison with opportunities in neighbouring catchments to identify areas of competitive advantage
- areas of potential cross-subsidisation to be used to aid development in disadvantaged areas or areas with latent potential.

Water quality management strategies and plans will be developed in alignment with water services plans developed in terms of the Water Services Act, 1997. Alignment will focus specifically on institutional arrangements, land use development, water quality performance objectives and facility (on which water use is exercised) management plans.

6.2.3 Remediation measures

The remediation strategy relates to those measures to be adopted and enforced to effect amelioration of degraded and/or impaired water resources or contaminated land areas as required by the environmental values adopted for the water resource.

To date and in the absence of a dedicated remediation strategy, various regulatory instruments, not specifically developed to address remediation, were applied to manage situations requiring remediation. This resulted in inadequate and/or inconsistent handling of the problems.

In order to enhance the capability to address these matters, a remediation strategy will be developed and implemented as a matter of urgency. Implementation of strategy should elevate regulatory capability to a level equivalent to that related to the other core strategies, namely the source-directed strategy and the resourcedirected strategy.

The remediation strategy will address impaired, degraded and contaminated land areas and water resources. Clean-up levels and targets, remediation approaches and measures, as well as prioritisation of remediation focus and effort, will be dictated primarily by appropriate risk-based approaches. However, rule-based best management practice measures could be appropriate and/or a requirement in some cases.

Implementation of financial provision to cover remedial action is currently being contemplated and could form part of the remediation strategy.

In the absence of a remediation strategy, its available regulatory instruments to handle situations requiring remediation will be applied as best as it can. In the interim, a Remediation Working Group has been instituted to provide guidance on the application of these tools to enhance at least consistency in approach.

In keeping with the thrust towards sustainable water use, repair or replacement of aquatic ecosystems will receive priority at a rate at least equal to the rate of

degradation and destruction. This matter will receive special attention in the remediation strategy.

This approach will non only be promoted on a facility/site level but also at a broader operational level by actively supporting remediation research as well as incorporating it in regional planning.

Financing and implementing remediation in those cases deemed to be the State's responsibility will continue. Remediation will be implemented on a case-by-case basis, depending on the relative risk levels and priorities assigned to them.

7 CROSS-CUTTING STRATEGIES

Cross-cutting strategies already adopted relate to:

- Partnerships
- Communication
- Capacity building.

As in the case of the core strategies, cross-cutting strategies are also addressed where applicable at various levels to aid in comprehension as well as operational guidance.

7.1 Partnership strategy

The success of the water quality management policy depends on the support that can harnessed to aid with the implementation and execution of policy from outside the spheres of government. This effort should be orchestrated into meaningful relationships, contributing to ongoing support. The establishment of an enabling environment, with specific mechanisms, should be promoted to facilitate partnerships between public, private and community organisations, provincial and local authorities, non-governmental organisations and public and private factors as well as international governmental and aid organisations. Appropriate voluntary approaches as outlined in **Section 10** will be employed as required to regulate partnership arrangements.

7.1.1 International scale

As a developing country, South Africa is dependent upon international support for the management of its water resource. Not only international co-operation and partnership in support of national actions but also specific actions stemming from the implementation of this policy are essential for the attainment of the water quality management goal. In addition to financial support, the water quality management effort also relies on international co-operation for capacity building, transfer of technology, research and information exchange.

The current donor-recipient dialogue and interaction will continue but is should be endeavoured to strengthen consultation mechanisms aimed at targeted and dependable support in identified areas.

7.1.2 National scale

Partnerships at national scale will be aimed at sectoral support. Sectoral organisations such as the Chamber of Mines, Agriculture South Africa and others must be convinced to accept responsibility for specific components of water quality management directly related to those sectors.

Initially, this effort should be focussed at understanding the potential effects of a sector on the water resource and the management of these effects. This should cover the continuum from research to the establishment of best management practices for implementation. The work must be encompassed in a national

strategic plan covering each identified sector. Technology development (**Section 9.12**) must also be addressed in this plan.

It is recognised that progress in this regard, has already been made, especially by the mining and chemical industries. However, this progress and effort must be expanded to all the major sectors forming part of the water use constituency. Specific partnership arrangements to underpin the identified effort must be put in place for meaningful and lasting delivery.

7.1.3 Regional scale

The regional effort should emulate the national partnership effort. However, although stemming from national guidance, these regional endeavours could be focussed on specific regional situations. Typical examples related to regional situations include the handling of excess contaminated mine water from coal or gold mining, the disposal of winery effluent and textile effluents.

The efforts already made to address these regional situations of which the Coaltech and Amanzi projects are examples, are acknowledged. However, in future, these efforts must be prioritised and coordinated proactively, aligned to the strategic guidance afforded from national scale work.

7.1.4 Local scale

Local scale efforts should provide the most tangible benefits to water resource protection. Efforts by Water Use Associations, local government, sectoral and community groups and/or individual water users should be harnessed through partnership arrangements to address specific local water resource situations. These efforts should not only focus on water quality but, if required, also include all the attributes contributing to water resource health. Addressing water quality in isolation could, in many cases, be short-sighted, allowing degradation of the other water resource attributes and possibly resulting in more pronounced, and maybe unsolvable, water quality problems in the longer term. Where applicable the effort at local scale will be explicitly documented in Catchment Management Strategies or associated action plans.

7.2 Communication strategy

Effective water quality management requires structured communication with external target audiences. The initial focus of this effort must be on conveying information to create an adequate level of awareness and understanding about the water resource, the management of the water resource and associated water quality related matters. This must be followed by motivational information aimed at changing perceptions, attitudes and behaviour. The initial effort of information transfer should create over time the climate of belief and understanding which will ultimately result in positive changes in attitudes, perceptions and behaviour.

Information transfer will be focused at selected target audiences. Target audiences will include both an internal audience, such as the personnel of the Department's head office, its Ministry and regional offices, and various external target audiences, including economic sectors and water users.

External communication will be supported wherever possible by the underlying message required by Government's communication strategy, included in Cabinet Memorandum No 3 of 2000. In terms of this requirement, the Government's commitment to the creation of a better life for all South Africans must be emphasised. Particular emphasis will also be placed on public involvement to strengthen the partnership between the water use constituency and Government.

7.3 Capacity building strategy

Successful implementation and execution of the adopted core water quality related strategies require, in addition to the Department of Water Affairs and Forestry's own personnel, the involvement of other Government departments, community-based organisations, non-governmental organisations and stakeholders in general. These bodies and/or persons must be empowered to participate meaningfully in the development and execution of these strategies and also to develop the capacity and flexibility to adapt to changing circumstances while remaining in a position to contribute to the water quality management effort.

More specifically, capacity building is required and recognised within the context of water quality management for the following reasons:

- It empowers stakeholders by offering them the opportunity to develop knowledge and skills, to acquire resources and to utilise their own capacity. These are in line with the view that the water resource must be harnessed as a social good.
- Stakeholders must be empowered in order to utilise the opportunity to contribute on an equal basis to the development and execution of the water quality management effort. Empowered stakeholders will be in a position to realise the importance of this involvement and the potential thereof to affect their living and/or operational environment.
- Empowered stakeholders can effectively fulfil their roles and responsibilities in the execution of the water quality management effort.

It is currently not contemplated to develop a capacity-building strategy specifically related to water quality management. The capacity-building requirements will be handled by the Water Sector Capacity Building Task Team. Active involvement of water quality management role players in the task team activity is foreseen. Moreover, the implementation of the communication strategy should add notably to the capacity building of the broad stakeholder base.

Specific outcomes that would be required from the eventual implementation of the capacity building strategy include:

- Community-controlled institutions become established which have a positive influence on policy development, demonstrate effective public lobbying and operate within structures open to influence.
- Increased decentralisation and participation management related to the water resource.
- Strong, accountable and representative leadership.
- Equal opportunity for people's development, allowing for broader social mobilisation and skills provision. This should contribute to increased levels of

participation, achievement and self-esteem fulfilment and ownership of interventions and/or actions instituted.

- Matureness with respect to what is fair or permissible and avoidance of the spreading of misinformation.
- Sharing of information that enables the further collection and interpretation of additional knowledge for action.
- Acceptance by all parties of a shared framework for problem-solving and evaluation of professional performance.

While the Water Sector Capacity Building Task Team undertakes its functions, the capacity building initiative will be instituted as part of the execution of the water quality management function as outlined below. It is recognised that these efforts could be expanded notably on completion of the task team's work.

7.3.1 National scale

The capacity building effort at this level will be aligned to the core strategy related to the establishment and enhancement of the key aspects that underpin sustainable water use. Immediate effort will be made to establish the envisaged high level steering group to aid with water resource capacity building within cabinet and legislative committees.

Ideally an early outcome of this effort will be the alignment of relevant legislation as well as the consistent enforcement of this legislation.

7.3.2 Regional scale

At this level, the water quality management's effort will be focused on building capacity within emerging Catchment Management Agencies. Regional offices of the Department of Water Affairs and Forestry will be specifically dedicated for these tasks. Initial effort will be primarily aimed at establishing capacity with respect to the technical aspects of water quality management.

7.3.3 Local scale

Efforts related to capacity building at this level stem from the requirements imposed by the core strategy related to the establishment and enhancement of the key aspects that underpin sustainable water use. Enhancement of stewardship for the water resource will be the focus of this capacity building effort. In this regard, the capacity building need is mainly with respect to:

- Creation of an enabling environment (will, knowledge and means)
- Development of human resources and strengthening of managerial systems
- Enhancement of institutional capacity for water resource management.

Through the adopted partnership creation strategy, the private sector will be engaged to assist through training and awareness-raising as well as monitoring and evaluation of progress in capacity building with community management structures.

8 MATTERS TO BE CONSIDERED RELATING TO WATER QUALITY MANAGEMENT STRATEGIES

In the development, refinement and execution of the adopted water quality management strategies, attention must be given to specific matters to enhance strategy effectiveness. Key matters requiring continuous attention are listed in this section.

8.1 Integrated water resource management

More than ever before, improvement in water resource management requires that the water quantity and quality aspects of the resource be viewed and managed in an integrated manner. Water quality related decisions invariably involve water quantity effects and vice versa. This relates primarily to water use decisions such as: allowing discharge of effluent; allowing impoundment of contaminated water; and allowing development of surface water resources to proceed within groundwater recharge areas and/or catchment areas. Conversely, changes in flow patterns, rerouting of water resources and changes to water allocation profiles could all have pronounced effects on water quality. Advance knowledge and the proactive engagement of these possible changes in the water resource are essential for effective water quality management.

Whilst the initial focus of improved water resource management is mainly on water quality and quantity aspects, this will be gradually expanded to address all water resource attributes, thereby addressing the full overall health of the water resource. Efforts towards enhanced integration will be pursued at both strategic and operational levels, involving all levels of water quality management.

Multi-disciplinary interactions in the development of overarching policy are being established as the norm. Institutional changes envisaged within the Department of Water Affairs and Forestry should not only enhance this effort but also facilitate improved operational action and associated decision-making. In this regard, the various disciplines representing key aspects of the water resource will be placed into structured contact for the day-to-day execution of the water resource management function.

8.2 Water as a valuable commodity

The National Water Act, 1998, recognises water as a valuable commodity - an "economic good". Hence, water use has an economic value and the use of water should reflect this value. Paying for the quantity of water used is well-entrenched but placing a value on and paying for the water quality aspect of water use is lagging. Mechanisms are already being developed to address this disparity, such as the water use charges. These mechanisms will be to incorporate gradually the water quality aspect of water use in order to reflect the full economic value of water as a commodity.

8.3 Sectoral focus

Effective water quality management requires a full understanding of specific sectors, such as dense settlements, urban development in general, agriculture and industry. Specific approaches to each of these sectors are being developed to allow application of appropriate water quality management measures to each individually.

Sectors will be addressed in an equitable manner, given the specific nature of each sector. No advantage from a regulatory control perspective should accrue from being associated with a specific sector. Discrepancies and shortcomings will be gradually phased out in the current water quality management approach.

8.4 Application of assessment methodologies

Information not derived from the utilisation of the latest assessment methodologies, regulatory decision-making could result in over-investment or under-investment in its measures to avert impairment of the water resource through water use. Utilisation of these methodologies (eg, risk based assessments, whole effluent toxicity testing and numerical water quality modelling) should lead to better effort and economic resource application, thereby liberating resources for application elsewhere in the economy.

The application of this approach is already reflected in the operational decisionmaking mechanism of this policy. Moreover, available assessment methodologies should also be used to aid with the quantification of residual risk associated with water use. In the absence of relevant information, an unrecognised residual risk could result in a lack of motivation for regulatory intervention, leading to excess risk and posing a threat to the water resource.

8.5 Integrated assessment

Giving effect to the principles of Integrated Environmental Management (IEM) by means of operational instruments such as Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) is well established in South Africa and is adequately regulated by environmental legislation. The application of these instruments are endorsed and they are especially favoured for their capacity to aggregate and align a wide range of environmental, social, economic and related considerations for decision making.

Wherever possible at an operational level, it must be endeavoured to align the water quality management effort with the broader integrated assessment, not only to rationalise effort and resources, but also to benefit from the enhanced information for decision-making arising from the application of these broader integrated assessment processes. Moreover, in the application of these instruments greater emphasis will be given to the identification and evaluation of social implications and benefits, or disbenefits, to the economy. Social implications will address all social groupings in terms of employment and income derived from development. Indirect income multiplies will also receive attention.

However, it could be viewed that currently the policies and laws which are likely to have an adverse effect on the country's water resource are not subjected to similar assessment. Hence, the concept of regulatory impact assessment must be introduced and enhanced. In terms of this concept policy introduced will be assessed in terms of its benefits to society.

8.6 Social and economic development

Social and economic development to be addressed in the execution of the water quality management function will take cognisance of future needs as well as the needs to address past imbalances (including gender). It is recognised that social and economic development are interrelated and the one cannot occur effectively without the other.

This is reflected in a definition of economic development, which is the process of creating wealth through the mobilisation of human, financial, capital, physical and natural resources to generate marketable goods and services.

Social development can be described as the process of organising human energies and activities at higher levels to achieve better standards of living. In terms of this policy document this includes the following:

- Improve access to water to increase levels of health and general well-being (this includes water for drinking through to recreational use)
- To create increased opportunities for commercial development and thereby reduction in levels of poverty
- Creating mechanisms to facilitate the reallocation of resources and opportunities leading to greater equity with the population.

Economic development is the process that leads to enterprise expansion, location, or start-up in a place positioned to accommodate it. In terms of this policy document this includes the following:

- Maximising the economic exploitation of water on a sustainable basis (this includes domestic and commercial purposes)
- Introduction of mechanism to allow market forces to determine the most economic allocation and use of water (in the longer term). This implies that water resources are efficiently allocated so that the availability of water and cost is not a constraint to development
- In the short-term allow for economic inefficiencies that will arise as stimulus is provided to previously disadvantaged areas and communities.

Hence, the water quality management function will be executed to influence and assist the processes of social and economic development in a manner these two processes are supportive of each other. Cognisance will also be taken that South Africa has had a history of directing social and economic development on a selective basis and not meeting the needs of the entire population. Specific social developmental needs within the context of water quantity management relate to the provision of disadvantaged communities with equal access to water of suitable quality, thereby increasing employment opportunities and reducing poverty and

social disintegration. Similarly, economic developmental needs can best be addressed by providing water at the right place and at a cost that justifies its economic use.

It is recognised that water quality cannot be effectively maintained or improved at a local level without community support. Realisation of benefits and development associated with water use are hence, necessary to ensure sustainable water use. Poverty will remain without appropriately applied development. Pervasive poverty will not only lead to water related infrastructure impairment and reduced, or lack, of the potential benefits of multiplier effects, but also to a lack of concern for the water resource and its quality.

It is also recognised that water quality (fit for use) could promote or impair social and economic development, depending or whether suitable water quality (fit for use) is attained or not. Direct effects related to these include health and human wellbeing. Moreover, this also applies to commercial development which contributes to overall economic development, reducing levels of poverty. Addressing these social equity attributes should resulting improved social stability, resulting in greater security of the water resource.

It should be acknowledged that the agencies directly involved in the execution of the water quality management function cannot be development agencies in themselves but can only add and/or assist in the creation of the conditions in which the desired social and economic development can take place. It should also be recognised that this effort is only part of a broader poverty eradication initiative of National government executed by a number of other organs of State, such as the Department of Agriculture, Department of Health, Department of Housing, Department of Social Development and the Department of Finance as well as supporting agencies.

8.7 Basic human well-being

Recognition of the multi-dimensional nature of basic human well-being requires a comprehensive and integrated approach involving all the governmental and other agencies having human well-being as part of their respective mandates.

Health, a most important aspect of human well-being and one of the dimensions of poverty, depends critically upon the availability of safe water for domestic use. Suitable water quality for this purpose will receive specific attention as part of the execution of the water quality management function. Enhancement of productive use of water with the objective of making more water available for wider application in promoting human-well-being (eg, subsistence food security) will also receive consideration.

Low income and legally temporarily settled communities will be exempted from water use charges and/or pollution related penalties. However, monies collected from the implementation of water use charge will be applied towards the required measures to protect the water resource.

8.8 Distribution of benefits derived from water use

Attention will be given to the manner in which the benefits derived from large-scale water use are routed back into the local economy and applied towards social development. Hence, the benefit pathway (including the specific actions required to rectify gender disparities) associated with water use will receive special attention in water use authorisation. This could require more appropriate social and economic analysis as part of an overall evaluation analysis indicating how the benefit from water use is distributed within society. Pure technical analysis, such as cost benefit or social accounting matrix of the benefit pathways associated with water use could be too limited to provide the appropriate emphasis on the requirements for local social and economic development. Site- or region-specific requirements and/or sensitivities could be overlooked. Operational strategies within the water quality management function will allow that these perspectives are considered in decision-making.

Inputs provided by water management institutions, such as public forums, could be key in the manner in which benefit distribution should be addressed at a local level. This will require that these institutions are representative, so as to reflect the views of those for whom this matter is of specific importance.

9 OPERATIONAL STRATEGIES

The operational strategies are in support of core and cross cutting strategies and are required for their operational implementation.

9.1 Water quality planning

Water quality planning as a dedicated and structured function as part of the overall water quality management function will be implemented. The scope of this planning function will be developed as a matter of urgency. It is foreseen that the implementation of the core strategy related to the maintenance and improvement of the quality of the country's water resource should primarily dictate the scope of the planning function. Taking cognisance and the influencing land use planning will also be key in the scope of this function.

The development and maintenance of a national water quality improvement schedule has already been identified as a requirement of this planning. This schedule will identify and list specific components of the water resource within Water Management Areas which require specific attention – because they could affect the water quality status of the water resource - and which must be considered in decision-making. The schedule will be aimed at providing the required water quality perspective on stressed water resources, unstressed water resources and those requiring maintenance.

The information obtained from the national water quality improvement schedule will also be key in providing the focus and priority which have to be assigned to the development of source-directed measures and the implementation of remediation initiatives.

The compilation of the schedule will take cognisance of the national and regional strategic importance of water resources. The National Water Resource Strategy will be key in providing guidance in this regard.

9.2 Decision-making in water quality management

Decision-making which could affect water quality in the execution of the water quality management function must not only contribute to the attainment of the water quality management goal but must also be conducted within a defined framework, leading to consistent, transparent and defensible decision-making. Specific areas within the water quality management function requiring decision-making include:

- Consideration of water use authorisations
- Setting of water resource quality objectives and related water quality targets
- Consideration of financial investment by the Department to aid with water quality management
- Evaluation of the adequacy of information presented for decision-making.

9.2.1 Consideration of water use authorisations

In the process of considering an authorisation for water use, the following will apply:

- Determination whether it is beneficial water use in the public interest. "Optimum" water use as advocated by the National Water Policy goes beyond productive use of water by aspiring that water is used optimally in the broader sense. This is termed "beneficial use of water in the public interest". Criteria for the assessment of the beneficial use of water are being developed. The economic and social benefits which could be derived from water use are key in these criteria. Equally to economic and social disbenefits from not allowing a water use must also be considered.
- Assessment whether the water use, when exercised, will comply with the decision-making hierarchy related to water use authorisation. The hierarchy considers source-directed, resource-directed and remediation-related requirements.
- Establishment of appropriate mechanisms for the control of water use, considering the modes of intervention as listed in **Section 10**. These include mechanisms such as voluntary approaches over and above routine authorisation mechanisms. Routine authorisation mechanisms include general authorisations, licences and compulsory licences. Consideration will also be given to whether security is required in respect of the obligations arising from the authorisation of water use. Initially, guidance on the nature of security required will be provided by the financial provision protocol in terms of the Minerals Act, 1991. A water quality specific protocol will be developed as a matter of urgency.

9.2.2 Decision-making hierarchy

The 1991 water quality management policy encompassed a hierarchical decisionmaking framework designed for the consideration of water use authorisations. The core of this framework is still applicable. However, adaptation of the framework was required to support the endeavour to achieve more effective water resource management and also to meet other overall policy and legislation requirements. The continuum related to water pollution prevention through waste prevention, reduction, recovery, treatment and final safe disposal still applies and commands the highest priority in the decision-making framework. However, allowance has been made that best management practice measures related to any of these continuum components could be reconsidered subject to the outcome of appropriate analysis.

The hierarchical decision-making framework has also been adapted to take into consideration requirements for attaining deserving environmental values where these have been identified as national and/or regional priorities and/or where imposing water resource protection measures could threaten sustainable water use.

Under these circumstances, short term degradation of the water quality of the specific water resource could be allowed, if it can be demonstrated with the required level of confidence that this will result in neither the irreversible degradation of the water resource nor the externalisation of costs to other users of the specific water resource. As indicated in the decision-making hierarchy, reclassification of the water resource can be considered only under very special conditions.

However, the above-mentioned allowance of short-term degradation of the water quality of the water resource will proceed within the overall thrust of water resource protection to maintain the quality of the country's water resources, to prevent its degradation and to remediate where required. The thrust also allows for improvement of water resource quality where justified.

The decision-making hierarchy taking cognisance of the above is:

- Prevention of externalities on the water resource. With reference to water use related to waste disposal or the discharge of water containing waste, the generation, prevention, reduction, recovery and treatment of waste will be enforced by incorporating best management practice measures as part of source-directed measures. It is recognised that the development and implementation of a comprehensive portfolio of best management practice measures could take time. The development of best management practice measures for priority sectors are well advanced and will be implemented as they are completed. In the absence of applicable best management practice measures, current sectoral and industry norms, specialist opinions and similar will be used to enforce preventative measures and the waste management continuum. However, it is recognised that best management practice measures devised for national application may not be appropriate under all circumstances. Therefore, consideration will be given to deviations from stipulated best management practice measures, provided that the motivation complies with the adopted decision-making requirements. Decision-making in cases where best management practice measures are absent can also be influenced in this manner.
- If the application of best management practice measures still results in a need for water use, this will be considered as follows:
 - limiting externalities on the water resource
 - in the case of water use related to the discharge of water containing waste or the disposal of waste, a minimum requirement or standard will apply. These relate to applicable waste standards or minimum requirements. Until applicable waste standards are developed for implementation, the current General and Special Effluent Standards will apply
 - concerning other water uses, such as impeding or diverting the flow of water in a water course, applicable requirements and norms as stipulated by guidelines or directives will apply.
- If the applicable minimum requirements or standards are not sufficient to ensure suitable water quality as dictated by special or site-specific sourcedictated measures, requirements or standards stricter than the minimum requirements or standards will be applied.
- Deviation from minimum requirements or standards or from special or sitespecific source-directed measures will receive consideration for the following situations:
 - on evidence that the enforcement of these measures could result in notable impairment of social and/or economic values and/or related environmental values
 - on evidence that this could facilitate or contribute to enhanced participation and/or benefit-sharing stemming from water use by those suffering from past racial, economic and gender discrimination.

 Reclassification of the water resource due to irreversible water resource impairment. Reclassification of the water resource can be considered under very special environmental value requirements.

It is recognised that the above concession poses a potential threat to resource water quality. Hence, decision-making in this regard will be guided, *inter alia*, by the following considerations:

- This is a requirement to balance long-term protection of the water resource with short to medium-term demand for water resource use
- The requirements of the national water resource improvement schedule
- Strict controls to protect human health and to limit risk for serious and/or irreversible water resource impairment
- Concessions will apply for a defined period of time
- Stakeholders must be involved in decision-making in order that they remain fully informed on the conditions and the possible consequences related to these concessions.

In addition to these considerations, since many of these concessions will involve water users who are not fully empowered to conduct water use effectively, it will be endeavoured to institute as part of the controls:

- Compliance assistance
- Mentorship.

In the execution of the above, "good faith" and compliance status of the water users will be assessed on an ongoing basis, taking cognisance of the nature of response to compliance violations and willingness to remediate where these violations resulted in unforeseen damage to the water resource. Continuous negative assessments could result in the termination of concessions.

9.2.3 Setting of resource quality objectives

In the setting of resource quality objectives, the following will receive attention:

- Setting of water user quality requirements at acceptable levels of confidence by utilising the best available scientific information and assessment methodologies
- Stated resource quality objectives derived from environmental values are likely to evolve over time. Hence, transitional pathways of resource quality objectives will also be considered and, if possible, stipulated.
- Alignment of stipulated resource quality objectives with the adopted catchment management strategy, especially with respect to enhancement of catchment water quality
- Consideration of improved/enhanced resource quality objectives. As technology improves and the costs for the attainment of stipulated resource quality objectives decrease, improved resource quality objectives could be considered.

9.2.4 Consideration of financial investment/contribution

Financial investment from fiscal source to manage the effects of externalities on the quality of a water resource will be considered, if justified under the following conditions:

- Remediation of the water resource is required due to externalities caused by historical actions. Historical actions generally refer to actions undertaken by entities or persons who are no longer traceable or where those activities were sanctioned by Government at that time
- Investment-sharing would enable a more speedy transition to the attainment of long-term resource-quality objectives and would avoid backsliding or irreversible losses
- Investment- or cost-sharing would significantly reduce enforcement and monitoring costs
- Where the level of investment required to achieve the adopted resource quality objectives are regarded as being inequitable if met by water users alone
- Where the interaction of the activities of a number of water users creates an externality and it is not possible or not cost-effective to identify adequately who is responsible for causing the externality
- Where it is not possible to quantify, in physical terms, the contribution from a particular source or the impact-associated effect on the water resource
- Where the activity entails the involvement of those previously suffering from racial and gender discrimination and where, in the absence of financial investment by the Department, this activity would not be possible
- Establishment of best management practice measures, thereby providing a prototype or role model for practical implementation by water users.

These conditions for financial investment are over and above the possible financial assistance for making licence application by deserving water users.

Irrespective of the above, financial investment from fiscal sources should be at a level only sufficient to trigger the necessary investment towards effective self-correcting, self-perpetuating water resource management systems. Hence, fiscal funds should be applied in such a manner that it neither substitutes for the responsibilities of others nor dilutes the perceptions of others about their own responsibilities towards the water resource.

9.2.5 Evaluation of adequacy of information

In general, the nature of information required for water quality management related decision-making is stipulated by guidelines, questionnaires and associated documentation issued primarily by the Department of Water Affairs and Forestry to guide information gathering, collation and presentation. However, it is recognised that these could be dated due to, *inter alia*, not taking cognisance of the latest advances and/or not appropriate for specific circumstances or site-specific conditions.

Hence, new information will be considered, taking cognisance of latest technological and/or assessment methodological advances, provided that it meets at least the following requirements:

- Appropriate scientific investigation and assessment
- Clear understanding of "cause and effect"
- Clear understanding of the water regime
- Information presented for decision-making must be at appropriate levels of confidence.

9.3 Water use charges and related mechanisms

Economic instruments will be employed to correct the bias caused by under-pricing and possible associated over-use of the water resource. This should bring the water quality aspect of water resource management into line with the manner in which the water quantity component is managed. It is also viewed that the implementation of these instruments will enable industry and other water users to meet water quality related norms and standards in the most cost-effective way, achieve improved water quality related performance (even better than required by standards) and generate revenue for the water resource management effort (including possible water resource remediation).

Regulatory and economic instruments as identified in **Section 10** will be developed and implemented as required. Implementation of water use charges will be the first of these economic instruments to be deployed and will be implemented as a matter of urgency. Water use charges will be sector-specific and will be based on the costs associated with the implementation of "best management practice" for water pollution prevention. It is contemplated that the water use charges will be set at a premium to the costs related to the implementation of best management practice measures (considering total cost associated with externalisation). Initially, these will only apply to point source waste discharges but will be gradually broadened to include diffuse sources of water pollution.

Market-based instruments have the potential to correct water use distortions and the attainment of desired resource conditions at the least cost. Tradable emission rights are a mechanism which can facilitate this situation that the cost for water use is ultimately determined by market forces. Hence, it must be allowed that a market in this regard becomes functional.

However, effective implementation of this mechanism requires that the right to an emission must have been established and confirmed. This can be achieved by the authorisation of water use related to emissions into the water resource. Once notable progress towards the authorisation of water use in this regard has been made, consideration will be given whether or not to proceed with the implementation of tradeable emission rights.

Water use charges and related mechanisms will gradually be phased in, to allow for a period of adaptation by current water users and associated effects on local and regional economies.

9.4 Influencing land use

Greater influence over land use and associated planning is regarded as key in effective water quality management. Hence, greater application of the powers afforded by the National Water Act, 1998 with respect to the declaration of controlled activities and their relation to land use is foreseen. In some cases, prohibition of certain types of land use could be enforced.

However, in an attempt to limit land use prohibition, collective regulatory effort related to land use planning must be coordinated and affected. This will especially apply to spatial land use and infrastructural development and the associated formalised processes. The envisaged water quality planning (**Section 9.1**) forming part of water quality management will give specific attention to this matter.

9.5 Compulsory licensing

Compulsory licensing could be considered for those water resources identified as water quality stressed. The national water quality improvement schedule will provide guidance on those water resources identified for which compulsory licensing will apply. Compulsory licensing can also be applied to other cases justified in terms of effective water quality management.

9.6 Co-operative governance

9.6.1 Strategic level

Within the ambit of water quality management, the core strategy related to the establishment and enhancement of the key aspects that underpin sustainable water use, is aimed at entrenching those aspects which will enhance sustainable water use at all levels. It has been identified in this policy that water resource protection must be considered by the Government at the same level as other national priorities (refer to core strategies). Attainment of this objective should strengthen and consolidate the Department of Water Affairs and Forestry (and supportive agencies) overall position to fulfil its lead role with respect to water resource management (including water quality and sources impacting on it). The envisaged high level steering group to guide overall water quality management policy should be key in facilitating the attainment of the above-stated aims. The relationship of this group with the environmental co-ordinating committee established in terms of NEMA must be clarified in the process of establishing this group's terms of reference.

9.6.2 External operational level

Various government departments and agencies are responsible for, or are involved at the operational level in, the management of environmental components. This segregation is due partly to historical reasons and partly to the benefits of separating regulatory from operational functions to avoid or limit conflicts of interest. There has been ongoing effort to formalise structures within which a coherent national approach to environmental management could be achieved. This specific aspect is addressed in the White Paper on Integrated Pollution Control and Waste Management. The White Paper indicates that a single entry point for authorisation applications will be investigated in consultation with relevant organs of State as provided by the National Environmental Management Act, 1998 and implemented as appropriate. Authorisation conditions will include, but not be limited to, standards, details of voluntary agreements, market-based instruments, reporting requirements and the frequency and method of regular review and update. Lead departments will, however, retain functional control and accountability in executing their specific regulatory mandates.

Although a single streamlined and efficient administrative system related to authorisation processes as referred to in the White Paper is still absent, the roles and responsibilities of the respective lead departments have largely been defined and that these are underpinning an evolving proactive approach to environmental management. Refinement of the interfaces between roles and responsibilities could go a long way towards the establishment of a workable operational model for environmental management. Efforts towards effective co-operative governance should focus on the enhancement of these interfaces and on the identification of "high risk policy shortcomings". In this regard, the establishment of a comprehensive portfolio of environmental laws and provisions for their effective implementation should receive special attention. Land use planning and development is a key factor.

The role of the Department of Environmental Affairs and Tourism as lead agent for the environment is recognised. This Department must provide guidance to enable other national and provincial Departments and local authorities to execute their respective environmental mandates.

As lead agent for water, the Department of Water Affairs and Forestry must play its role to influence other spheres of government to meet their obligations with respect to the water resource. It is foreseen that this will primarily relate to influencing spatial land use and infrastructural development by means of participating actively in formal processes. Typically, these processes include Integrated Development Planning (IDP), Spatial Development Initiatives (SDI), Land Development Objectives (LDO), etc.

This Department of Water Affairs and Forestry must also aid in the capacity building of other spheres of government in terms of legal, administrative and enforcement capacity, as well as enhancement of operational efficiency. It is foreseen that the Department's regional offices must play a key role in this regard. The Department must specifically contribute to this effort by:

- The development and improvement of cross-cutting procedures to obviate ambiguity, to refine roles and responsibilities and to address technical shortcomings within these procedures.
- Contributing to the development of mutual decision-making mechanisms and explaining relevant internal Departmental decision-making mechanisms.
- Providing competent representation on forums established for this coordinated effort, which representation is empowered and mandated to contribute to meaningful deliberations and decision-making.

Co-operation governance will also be aided by involving stakeholders in decisionmaking processes related to this policy. Meaningful contribution will require that stakeholders be empowered with respect to key aspects of water quality management. Such aspects include, for example, environmental value trade-offs and the understanding of cause-and-effect relationships related to water resource impairment.

9.6.3 Internal operational level

Successful functioning of the Department of Water Affairs and Forestry's structured matrix management systems requires concerted efforts to achieve internal coordination between Head Office and the regional offices, as well as among the regional offices themselves. Coordination is aided by the institution of a number of standing committees at various levels within the organisation.

The intended institutional changes within the Department towards enhanced integrated water resource management should contribute to more effective water resource management by the Department. It should also add to an improved overall effect from Government. The unified and coherent input that can be provided by the Department should aid the overall regulatory effort.

However, the institutional arrangements created to facilitate co-operative governance could be of limited value if not augmented with the provision of capable and competent personnel and supported by adequate regulatory and operational tools. Hence, the drive to train personnel and to develop regulatory and operational tools to assist personnel in the execution of the water quality management function.

9.7 Departmental capacity enhancement

In addition to the enhancement of the capability of personnel involved in the execution of the water quality management function, the water quality management function will also require a shift in the focus of personnel. This will require training and re-skilling of personnel to be equipped for the execution of the changing water quality management function. This must be achieved within the objectives of transformation adopted by the Government. The organisational design must facilitate this by providing for mentoring and career development as well as for training of existing personnel.

These requirements have to be matched with empowered water sector institutions aiding in the execution of the water quality management function. Adequate capacity and expertise will have to be established in these institutions. It is envisaged that much of this empowerment will be undertaken by the existing Regional offices of the Department of Water Affairs and Forestry at water management institution and water user levels.

9.8 Organisational design

Organisational transformation of the water resource management function, and hence also the water quality management function, is underway to bring these in line with public service requirements for customer services and representivity as well as the institutional transformation of the water sector required by legislation. Institutional separation of regulatory and implementation functions is required, resulting in the Department of Water Affairs and Forestry being the regulator and other institutions, particularly CMAs, being the implementers.

Functions within water resource management comprising components of environmental protection of the water resource and regulatory authorisation of water use are gradually being separated. In terms of a decision by the Committee for Environmental Co-ordination (NEMA), environmental management and authorisation of development must be distinctly separated within a department if both are performed by that department. This implies that the water resource development and water services functions of the Department of Water Affairs and Forestry must be accommodated in separate entities from the other water resource management functions. Re-structuring of the water quality management function are being aligned with this and other requirements, which could arise from organisational design.

9.9 Enforcement

It will be endeavoured to continue with the current enforcement approach which is more co-operative than confrontational. Legal action will only be instituted as a last resort where offenders wilfully and/or negligently violate the requirements of the National Water Act, 1998, and are clearly unwilling to comply with the provisions of the Act.

It is viewed that this is an important way of arresting deterioration and achieving improvement in water quality. The approach translates into compliance assistance, compliance incentives and enforcement actions. Other operational instruments as listed in **Section 10** can also be applied in this regard.

Negotiation on preventive measures, aimed at achieving water quality targets and effective internalisation of costs, will be conducted up-front to establish the compliance framework.

However, it is acknowledged that the current approach has not been successful in all cases in controlling diffuse sources of water pollution. However, with the greater emphasis on catchment management, which will stem from the implementation of resource-directed measures, substantial improvements will be achieved. Sources of diffuse pollution will receive greater attention and will be more readily tracked in the course of developing catchment management strategies. Establishing water quality related "cause and effect" links at local levels within Water Management Areas will be central to such strategies.

Any changes in the enforcement approach will have to take cognisance of the available administrative support for the effective execution of such an approach.

9.10 Conflict resolution

Possible areas of conflict that could arise from the execution of the water quality management function include:

- Imposing source-directed measures on water use
- Stipulation of water quality performance targets for water use
- Setting of environmental values
- Execution of roles and responsibilities by spheres of government and/or water management institutions.

As part of the authorisation process for water use, it will be endeavoured to engage with the water user to ensure that the conditions imposed on the water use are clear and justified to the water user. Any conflict that arises once the authorisation has been concluded will be referred to the Water Tribunal for resolution.

Environmental values applicable to a water resource will be established in a consensus-seeking situation, involving all relevant stakeholders. The potential for this conflict will be limited by means of the establishment and maintenance of sound co-operative governance mechanisms.

Agreed procedures, such as memoranda of understanding, will be instituted as far as possible. It must be endeavoured to have such arrangements in place at least for each interface with the other line function Departments involved in environmental management.

9.11 Research and development

Sustainable water use is dependent on maintaining and developing national capacities in the field of water research. Certain methodologies used in water quality management are already available and should not be reinvented, but efforts should be directed towards adapting these to local circumstances. Fundamental research could be required in special cases arising from unique local circumstances.

The Water Research Commission will be key in facilitating research and development. Latest trends towards multi-disciplinary and participatory research will be encouraged. Moreover, guidance by means of the water quality management function will be provided to the Water Research Commission and the research community with respect to priority and direction on water quality related research.

9.12 Technology development

It is recognised that only a collective effort addressing a number of aspects within the water quality management function has the potential to curb the gradual deterioration experienced in the quality of the country's water resource. The identification and demonstration of technology to aid in his regard is key in this effort.

Up to the present, technology development supportive to the water quality management function was primarily linked with research and development efforts. Technology development requirements were also addressed to a limited extent in specific strategies such as the mining strategy, underpinning the overall water quality management function.

However, owing to the pervasive threat to the quality of the country's water resource, technology development as mechanised to counter this threat, must be elevated for implementation as a specific operational strategy. This strategy needs immediate attention since technology development and its implementation normally requires long lead times. The strategy must address at least the following:

- Priority areas where technology development and/or advancement are required
- Identification and evaluation of candidate technologies

- Demonstration of suitability of technology
- Implementation of proven technology
- Responsibility for technology development and implementation.

Collective input and support over the full water sector will be required to ensure the success of this strategy. The requirements of individual sectors within the overall water sector to aid in this effort will be addressed in the individual sector approaches as these are formulated.

9.13 Information management

Information management primarily relates to receipt, verification, collation, analysis, storage, retrieval, presentation and assessment of data for decision-making and reporting.

Systems for information management, such as the Water Management Systems (WMS) and the Water Use and Registration Management System (WARMS) currently used by the Department of Water Affairs and Forestry in adding its role within the execution of the water quality management function, must be reviewed and upgraded. If required, these systems must be augmented by other systems in order to position the Department not only to conduct its role within water quality management effectively but also to allow a free flow of information to stakeholders.

As part of information management, the Department of Water Affairs and Forestry as well as other agencies involved in water quality arrangement must:

- Report on and make relevant information related to the water quality status of water resources and to water quality management in general available as dictated by the Promotion of Access to Information Act, 2000
- Inform water users about any notable incident that might affect the quality of water resources
- Open records of pollutant discharges and other monitored activities for public information
- Regard water quality related data as a national resource.

Other parties also managing water quality related information can assist the formal information management effort by:

- Working together to develop standards and protocols to ensure the compatibility and transferability of information between databases
- Collaborating to help establish and develop local and national databases to meet the needs of local users
- Paying particular attention to the need to present decision-makers with relevant information in a comprehensible and useable form, with confidence limits clearly stated
- Developing and participating in networks for the free two-way flow of information.

9.14 Stakeholder consultation

Stakeholder consultation is an ongoing, interactive process between the stakeholders within the water sector aimed at improved decision-making in the implementation and execution of *inter alia* the water quality management function.

It is recognised that stakeholder consultation within the water quality management operational environment is still lacking in some instances and that personnel need guidance on its implementation. Accepted principles of public consultation will be adhered to and it will be endeavoured to tailor and align the public consultation effort to the requirements of these principles. A concerted effort will be made to address shortcomings in the current operational execution of stakeholder consultation.

In the execution of the water quality management function, stakeholder consultation is specifically applied to the following:

- Development of policies and strategies
- Development of catchment management strategies and plans
- Building of external capacity to enhance and assist with the execution of water quality policies and strategies
- Input into water use authorisations
- Monitoring of licence compliance.

Intervention to obtain the desired water quality related performance by water users will be augmented by raising social awareness of the water resource through participation and communication.

10 OPERATIONAL INSTRUMENTS

Various categories of operational instruments are listed in this section and are distinguished from operational strategies in that they are "pure" instruments which can be applied in water quality management as dictated by the adopted operational strategies without any predetermined mode of application.

10.1 Modes of intervention

Intervention required to ensure that water use is exercised in a manner that protects the water resource and promotes sustainable water use. Modes of intervention that will influence the behaviour of water users and that will be employed in the execution of water quality management function are outlined in this chapter.

10.1.1 Direct intervention

Direct intervention typically takes the form of laws, regulations and directives dictating control and/or prescribing the behaviour of water users. It generally uses instruments based on enforcing norms or standards. The authorisation of water quality related water use will primarily utilise direct intervention.

10.1.2 Incentive programmes

Incentive-based instruments provide a means of influencing the behaviour of water users by applying market-based instruments.

10.1.3 Supportive programmes

Interventions are often required to create circumstances conducive to efficient regulation. Support programmes include capacity building to educate and to create the desire for effective water use. The provision of extension and/or mentoring services to advise and assist individuals or emerging enterprises could even be considered.

10.1.4 Voluntary programmes

This type of intervention could apply to both water users and spheres of government. It could include self-imposed discipline by the water user but could also be a formal agreement between spheres of government. The latter is a negotiated situation without legislative sanction.

10.2 Signalling mechanisms

Signalling mechanisms are aimed at assisting regulatory authorities to encourage water users, whose actions affect the water resources, to change their behaviour in order to meet agreed responsibilities as a minimum and thus to achieve desired resource conditions collectively.

When adopting a portfolio of signalling tools, the primary goal should be to change the behaviour of water users with the least cost and effort.

Typical signalling tools that will be considered, as required, are listed in this section.

10.2.1 Tradeable emission rights

Tradeable emission permits can be introduced to encourage producers to deliver desired resource conditions collectively at least cost. The result can be more efficient resource use and more rapid attainment of the long-term objective. In the United States of America, air pollution has been controlled effectively by first setting air quality targets and then allocating tradeable emission permits.

10.2.2 Charging (market-based)

Charging can be effective in reflecting the magnitude of the externalities created by those users who cannot be influenced so readily by standards or market-based trading instruments.

This is particularly true in the urban context where users are often spatially distant from the resource they use or dispose waste into. Where no direct impact on the resource is perceived, charges can be used to signal that all users share responsibility for resource degradation and resource protection.

10.2.3 Grant and fee rebates

Grant and fee rebates may be appropriate incentives to encourage the internalisation of externalities. Rebates may, for example, be appropriate for water use by an organisation whose actions impose fewer costs on the community.

The case for grants is strongest when a water user's actions exceed individual responsibilities and produce substantial benefits that cannot be recovered through normal market processes. In such cases, the incentive is not a subsidy but rather reimbursement for work done on behalf of society. Usually, the service provided is access to, or benefit from, a public good. Examples include amenity values resulting from enhancing wetlands and investment in research and development leading to new water re-use technologies.

10.2.4 Standards

Standards can be used to define individual responsibilities and/or performance. A financial incentive, such as a fine for non-compliance, can be associated with this approach. The threat of a fine, coupled with an assessment of the probability of being caught, can be used to internalise externalities.

A weakness of the standards approach is that there can be significant control costs associated with its implementation. Further legislative backing is often required to give standards an appropriate weight to allow effective enforcement.

10.2.5 Incentive-based instruments

Incentive-based instruments are another form of economic instrument through which investment in, for example, cleaner production technologies can be promoted. Forms of incentive-based instrument include:

- Investment credits
- Accelerated depreciation
- Product/service subsidies
- Basic need subsidies (already in place as lifeline tariff for water services).

10.3 Voluntary approaches

This type of intervention could apply to both the water user and the sphere of government. It could constitute self-imposed discipline by the water user or a formal agreement between spheres of government. The latter is a negotiated situation without direct legislative sanction.

10.3.1 Self-regulation

Unilateral or multi-lateral commitments are self-regulatory instruments instituted by the regulated community under its own volition, imposing controls which are aligned with the policies and procedures of the regulator. Self-imposed discipline, will be encouraged as far as it may affect enhanced water quality management. Typical examples include ISO 14000 systems, responsible care programmes and eco-labelling. This will not apply to the setting of water quality related performance measures for attainment of these targets and the associated control of compliance with these targets.

10.3.2 Co-regulation

Negotiated agreements are co-regulatory instruments establishing interactive relationships between the regulator and the regulated community to improve environmental performance in compliance with, or beyond, legal requirements.

Advancement of the application of this regulatory instrument as part of its drive towards development and implementation of voluntary approaches aimed at enhancing and strengthening regulatory control is favoured.

10.3.3 Agreed procedures (co-operation agreements)

Agreed procedures between organs of State to regulate the arrangement between these parties in the fulfilment of their respective regulatory mandates could contribute to improved co-operative governance.

This should preferably reflect a negotiated situation without entrenching the agreed arrangement in legislation. A number of these agreements have been established and have proven to be useful.

11 MONITORING ASSESSMENT SYSTEM

Monitoring in the execution of the water quality management function will focus on the following levels:

- Strategic
- Operational.

A monitoring system meeting the requirements as stipulated in this chapter will be implemented gradually.

11.1 Strategic level

At this level, monitoring will be concerned primarily with the assessment of the implementation and performance of the water quality management policy and related strategy initiatives. Specific attention will be given to:

- Performance of water quality management policy, supporting legislation and related institutional arrangements in the attainment of stated policy goals. Policy will be upgraded and/or revised if monitoring indicates that it is outdated and not supportive of the attainment of the stated water quality management goal
- Progress with national water resource protection and water quality enhancement thrust
- Attainment of social and economic development requirements within the context of water quality management.
- Utilising opportunities for harnessing economic and market forces to enhance water quality management.
- Overall land-use changes and possible enhanced water quality related threats to water resources
- Changes in public behaviour and attitudes towards water resources
- National consistency in the processes for the setting of water quality related goals, objectives and standards
- Changes in international trends in water quality management, specifically related to international signals on sustainable development, which could influence sustainable water use.

The establishment of a programme of national environmental monitoring and auditing, with Departments reporting on the state of the environmental components within their jurisdiction on a regular basis will be supported and encouraged. The reporting must at least reflect performance in achieving targets for improved environmental quality and standard of living.

Support and assistance in the development of sustainability indicators. These are key for assessing whether or not progress is made to achieve sustainable use of the water resource. The required information must also be provided to the Department of Environmental Affairs and Tourism to monitor the achievement, promotion and protection of a sustainable environment as required by NEMA.

11.2 Operational level

Monitoring at an operational level will be aimed at tracking water resource quality and also administrative and operational processes employed to execute the water quality management function. Tracking will be focussed on the aspects listed below.

- Key physical, chemical and biological constituents reflecting the health and status of all significant water resources will be monitored. Specific attention will be given to those portions of the water resource where decisions were taken which could affect the quality of the water resource based on the outcome of risk-based analysis. This information will be used to enhance decision-making and the scientific knowledge base. National, catchment and compliance levels monitoring will be gradually expanded and improved to be in a position to meet these requirements.
- Attainment of improved human well-being in-so-far as longer and healthier life and access to the water resources to aid with a decent of standard of living.
- Clear and explicit administrative processes, resulting in transparent, fair and just decision-making. Meeting the requirements of the Promotion of Administrative Justice Act, 2000 will be key in this regard
- Clear and explicit assignment of roles and responsibilities for the various levels of administration and operation
- Auditing and reporting accountability
- Matching of the administrative structures and regulatory efforts to physical, economic and social constraints, prevalent especially at regional and/or Water Management Area levels
- Administrative mechanisms responsive to change and development over time, changing public preferences for environmental quality and new technical options
- Involvement of all stakeholders in a meaningful manner in the setting of goals, development of plans and implementation of strategies.

12 AUDITING SYSTEM

A national auditing system aligned with the adopted monitoring system will be instituted. Similar to the monitored system, the auditing system will also function at strategic and operational levels. At each of these levels, the auditing system will address:

- Effectiveness of systems employed for information gathering, assessment and presentation
- Integrity of information utilised in decision-making
- Effectiveness of control systems instituted to verify the above.

In the implementation of the auditing system, initial attention will be concentrated on potential "high risk" areas in order to ensure effective functioning of water quality management as a matter of urgency.

It is foreseen that scheduled audits by independent external parties will form part of the auditing system.

13 IMPLEMENTATION OF POLICY

The implementation and execution of the water quality management policy will require attention to the issues outlined in this chapter.

13.1 Establishment of an enabling framework

- Establishment of tools to address social, economic and associated political factors
- Consideration will be given to develop a socio-economic operational strategy which could encompass these tools
- Creation of a national ethos with respect to the care and protection of the national water resource
- Establishment of a water quality planning function and determination of the scope for this function
- Development of criteria to assess "beneficial" water use in the public interest
- Creation of capacity within the water sector to aid the Department in the execution of the water quality management function
- Develop mechanisms for engagement of donor-recipient dialogue
- Develop a remediation strategy to address impaired and/or degraded water resources as well as contaminated land areas posing a threat to the health of the water resource
- Develop and implement national monitoring and auditing systems focused at strategic and operational aspects of the water quality management function
- Embark on gradual implementation of the partnership strategy
- Develop source-directed measures and associated best management practices to support the strategy to maintain and improve the quality of the country's water resource
- Complete the prototype work on resource-directed measures to guide the development of catchment management strategies
- Participate in the functioning of the Water Sector Capacity Building Task Team
- Proceed with the phasing out of discrepancies and shortcomings in the Department's sectoral focus within water quality management
- Development of technology development and operational strategy
- Formalise assessment methodologies for their general application in the determination of the possible effect of water use on the quality of the water resource
- Complete the water use charge system currently under development for implementation
- Revise and implement an improved information management system related to water quality management

- Address possible shortcomings in the operational approaches to stakeholder consultation and participation within the execution of the water quality management function
- Establish a methodology and associated approach to assess policy introduced by the Department in terms of its benefit to society
- Investigate the suitability of the implementation of a tradeable emission right system whilst emission rights are being formalised by means of authorisation
- Develop and formalise a financial security protocol to be used in support of water use authorisation
- Develop a protocol for security provision supporting water use authorisation.

13.2 Establishment of an institutional framework

- Creation of a high level steering committee to aid with the influencing of national decision-makers on water resource protection
- Complete the organisational design on which the Department has embarked
- Training and re-skilling of personnel to be equipped to execute the changing water quality management function
- Establish formal representation on international forums on sustainable development.

13.3 Establishment of a legislative framework

Note: Assessment indicates that the National Water Act, 1998, in its current form is adequate to facilitate the implementation of this policy.

GLOSSARY

The glossary of terms related to this policy was compiled from definitions as given in the National Water Act, 1998, other Departmental documentation and definitions specifically formulated for the purposes of this policy.

Beneficial uses

Refer to Environmental Values

Catchment

In relation to a watercourse or watercourses or part of a watercourse, means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points.

Conservation

In relation to a water resource means the efficient use and saving of water achieved through measures such as water saving devices, water-efficient processes, water demand management and water rationing.

Equity (global)

Equity at this level is primarily concerned with securing global equity by redistributing resources to poorer nations whilst encouraging their economic growth.

Equity (local)

Equity in a South African context primarily relates to promoting access of vulnerable and needy groups of the country's population to resources and opportunities that the more affluent groupings are privileged to.

Externality

The impact of changed environmental conditions on people and/or systems that do not fully participate in the process that caused these conditions to change.

Estuary

Means a partially or fully enclosed body of water:

- Which is open to the sea permanently or periodically and
- Within which the sea water can be diluted to an extent that is measureable with fresh water drained from land.

Environmental values

Particular values related to the water resource that are conducive to public and/or environmental benefit/use, welfare, safety or health and that require protection from the effects of impaired water quality. Several environmental values may be designated for a particular water resource.

Guideline

Numerical concentration limit or narrative statement (water quality) established to support and maintain a particular objective.

In-stream habitat

Includes the physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse.

Levels of service provided by water authorities

The parameters that specify the product or the service delivered by the water authority to its customers. Levels of service may include the quantity and quality of drinking water or effluent for reuse.

Management objectives

Management objectives describe the overall pollution load targets for the catchment and sub-catchments of a Water Management Area.

Objectives

See water quality objectives.

Principles

The fundamental policies and philosophies which are used as the basis for action.

Process

The course of action designed to achieve an intended result.

Product

The desired outcome.

Pollution

Means the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it:

- Less fit for any beneficial purpose for which it may reasonably be expected to be used,
- Or harmful or potentially harmful:
 - to the welfare, health or safety of human beings
 - to the resource quality or
 - to property

Note: In terms of water quality management, water pollution occurs when the degradation of water quality proceeds beyond the agreed level of water quality established in the process of stipulating environmental values related to a water resource.

Protection

In relation to a water resource means:

- maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way
- prevention of the degradation of the water resource and
- the rehabilitation of the water resource.

Resource quality

Means the quality of all the aspects of a water resource including:

- the quantity, patterns, timing, water level and assurance of instream flow
- the water quality, including the physical, chemical and biological characteristics of the water
- the characteristics, condition and distribution of the aquatic biota.

Riparian habitat

Includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

Reserve

The Reserve is central to water resource management and enjoys priority of use by right. The Reserve relates to the quantity and quality of water required:

- To satisfy basic human needs by securing basic water supply
- To protect aquatic ecosystems in order to secure ecologically sustainable development and use of water resources.

Stewardship

The process whereby individuals or organisations take responsibility for managing a water resource appropriately and acting with due care to avoid damage to others and to the water resource.

Standard (water quality)

A water quality objective and/or performance target which can be enforced by law.

Single source interventions

Single source interventions address the impacts or requirements of single pollution sources within a catchment or sub-catchment context.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generation to meet their own needs.

Waste

Includes any solid material or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in such volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted.

Water quality objectives

A set of numbers or guidelines which satisfy all of the environmental values for a particular water body.

Water quality monitoring

Monitoring can be regarded as the systematic and careful collection and analysis of samples, observations and *in situ* measurements with the aim of providing information and knowledge on a water resource.

Water use

The National Water Act, 1998, stipulates 11 water uses which require consideration in the execution of the water quality management function. These uses include: taking water from a water resource and storing water; conducting activities which reduce stream flow; waste discharge and disposal; controlled activities (activities which could impact detrimentally on the water resource); altering a water course; removing water found underground for certain purposes; and recreational use. Hence, use of water is no longer limited to consumptive use but also includes non-consumptive uses such as recreation or the discharge of waste. Since resource quality encompasses all aspects of the water resource, such as hydrological characteristics, physical, chemical and biological characteristics, and riparian habitat and aquatic biotic aspects, all 11 water uses could potentially affect water resource quality.

Water quality management plans

Water quality management plans specify the management actions, responsibilities, resources and time frames to achieve the stated resource quality objectives.

Watercourse

Include the following:

- A river or spring
- A natural channel in which water flows regularly or intermittently
- A wetland, lake or dam into which water flows and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse and a reference to a watercourse includes where relevant its bed and banks.

Water management area

Is an area established as a management unit in the national water resource strategy within which a Catchment Management Agency will conduct the protection, use, development, conservation, management and control of water resources.

Water management institution

Means a Catchment Management Agency, a Water User Association, a body responsible for international water management or any person who fulfils the functions of a water management institution in terms of this Act.

Water resource

Includes a watercourse, surface water, estuary or aquifer.

Wetland

Means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.