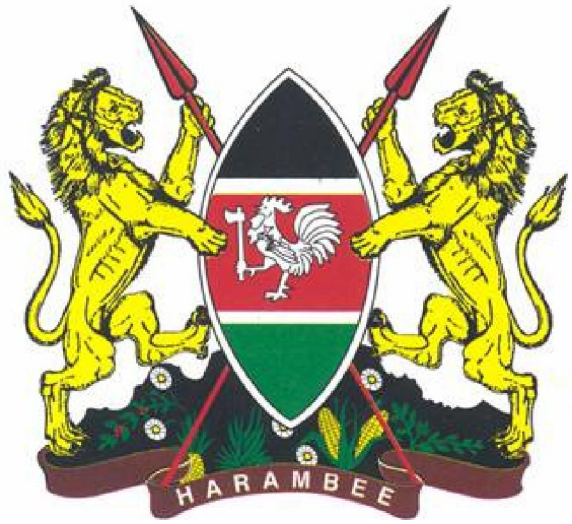
Ministry of Water and Irrigation



The National Water Resources Management Strategy (NWRMS)

(2006-2008)

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Foreword

Water is an important natural resource to all forms of life and their existence; for mankind, it is the backbone of growth and prosperity The growing demands for it against the limited temporal natural endowment and its increasing scarcity could result in devastating conflicts and catastrophes.

The hydrological variability causes significant economic losses and the country has to develop the buffering capacity to deal with the shocks of floods and droughts. This buffering capacity can be provided by a mixture of measures including structural ones like dams/pans, dykes, detention basins and boreholes or non-structural ones like catchment, wetland and floodplain management, agricultural policy and land use policy. Impacts of past and present disasters in the form of the El Nino floods and the La Nina drought have been so severe that within a few months, they have undone years of economic growth, devastating an already fragile economy, thus exacerbating poverty.

Against this background, the NARC Government has designed a comprehensive sector development strategy with clear division of roles and partnerships between the government, the private sector and the beneficiaries. The elaborate legal and institutional framework detailed in the Water Act 2002 is aimed at accommodating the new operational environment.

The decentralized water administration approach will create incentives for the private sector and communities to play an active role in water resources management at the national, catchment and sub-catchment levels. Indeed, the World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa, in 2002 recognized water as a core focus area towards sustainable development contributing to raising awareness to the public and further in placing water high on the international political agenda. It was in this conference that the UN Secretary - General proposed the five key areas of action towards sustainable development: water, energy, health, agriculture and bio-diversity which have been brought together under acronym WEHAB.

Given that Kenya faces serious challenges with regard to the management of its water resources to satisfy sectoral demands, the First Natural Water Resource Management Strategy (NWRMS) provides a clear, accountable and transparent road map for assessing, maintaining, enhancing, developing and managing the limited available, renewable, fresh water resources using an integrated approach and on a sustainable basis. The low level development of this resource estimated at less than 20% (1.6 BCM per annum) against the surface water potential of 7.4 BCM and groundwater potential of 1.0 BCM per annum calls for extensive investment to achieve maximum utilization of the renewable fraction of the freshwater resources. This will ensure reversing catchment degradation and controlling pollution.

The country's water scarce category of 647m^3 per capita against the
global benchmark of 1000m^3 is reason enough to implement this Strategy which will be in force until amended or revised as provided under section 11 of the Water Act 2002 which shall be initially 3 years after gazetting and 5 years there after. The Government has embarked on a structured effort to sensitize the stakeholders and recipient communities on the principles of water governance for the sustainable management of the finite resource to ensure the fulfillment of Economic Recovery Strategy and Wealth Creation.

Hon. John Mutua Katuku, M.P.
Minister for Water and Irrigation.

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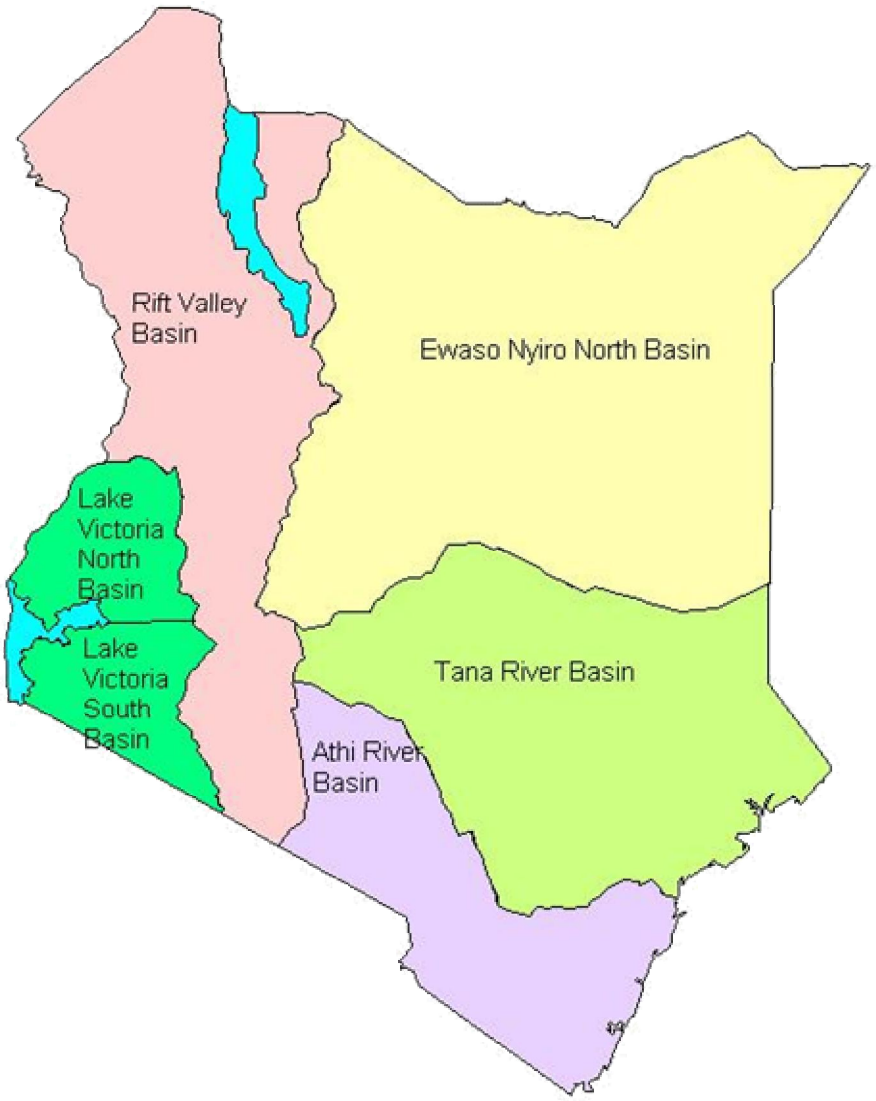


1 Introduction

1.1 Issues and Challenges

Kenya with a current population of 32 million and a projected population of 43 million by 2015, faces enormous challenges in management of its limited water resources. The magnitude of the issues and challenges and severity of the water crisis, that currently face Kenya cut across most sectors of the economy making water resources management a high priority requiring urgent attention.

Water scarcity

Kenya is classified as a water-scarce country. The natural endowment of renewable freshwater is currently about 21 BCM (billion cubic meters) or 650 m^3 per capita per annum. A country is categorised "water-scarce" if its renewable freshwater potential is less than 1,000 m^3 per capita per annum. By 2025, Kenya is projected to have a renewable freshwater supply of only 235 m^3 per capita per annum.

Water resources underdeveloped

About 40% of the renewable freshwater has potential for development and this represents the safe yield. The remaining 60% are required to sustain the flows in rivers so as to ensure ecological biodiversity and acting as a reserve for development beyond the timeframes of the strategies. Kenya's safe yield of surface water resources is 7.4 BCM per annum and the safe yield of groundwater about 1.0 BCM per annum. The current water abstractions are only a fraction (13%-19%) of the assessed safe yield or potential for development, which in 1992 amounted to 1.1 BCM per annum and is currently 1.6 BCM/annum, thus indicating an extremely low level of development. This extremely low level of development portrays a negative picture of the country's commitment to developing water resources. Kenya, although water-scarce, has room for extensive development towards achieving maximum utilisation of the renewable fraction of the freshwater resources.

Climate variability

Rainfall patterns in Kenya are extremely variable not only spatially and temporally, but also in rainfall intensities. This makes the natural flow of water in the watercourses highly variable in space and in time. Major recent floods (3 year recurrence) which effected Kenya occurred in 1997-8 (El Nino) and 2003. Major drought periods have been recorded every 7-10 years with the severest occurring in 1981-1985 and 1998-2000. The high variability of rainfall patterns affects the annual safe yields that may be extracted and could only be overcome by optimising, providing and managing of water storage facilities. However, the previous actors in the water sector (GoK and Development Partners) did not give adequate priority to water storage mainly due to the high investment costs.

Catchment degradation

Catchment degradation is causing increased runoff, flash flooding, reduced infiltration, erosion and siltation and this is undermining the limited sustainable water resources base in the country. The main causes of catchment degradation are poor farming methods, population pressure (forest excision for resettlement) and deforestation (for agricultural land and fuel wood). For example, the sediment yields for the Ewaso N'giro and Tana Rivers have increased 15 times the level of 1970. Catchment degradation will invariably affect surface water availability as rivers and reservoirs will dry up.

Water resources assessment and monitoring

The hydrometric network and data recording and reporting system for monitoring and assessing the river flows has deteriorated and can no longer support adequate assessment of the water resources base of the country. The number of river gauging stations in Kenya has shrunk from over 900 in the early 70s to less than 100 currently operational. Also the monitoring of groundwater resources and

water resources quality has not been given the attention it deserves. The data gaps in the present assessments need to be addressed.

Transboundary water resources

Kenya's neighbours share over half of Kenya's water resources, mostly surface water. Through the Lake Victoria Basin, Kenya provides about 45% of surface water inflows to Lake Victoria, and hence to the upper River Nile. This inter-dependence between Kenya, its immediate neighbours, and downstream and upstream Nile countries has considerable implications in the management of the country's major water resources. These resources must be jointly managed within agreed frameworks to ensure equity and to avoid conflict.

The challenge to the management of Kenya's water resources must therefore offset negative impacts from climatic variability, ensure fair utilisation of trans-boundary waters and reverse the growing degradation of water resources thereby achieving a water secure Kenya. This has become a daunting challenge that has not been adequately addressed during the last three decades. There have been inadequate investments in hydraulic and storage structures for flood control, energy generation, irrigation development, urban, industrial, rural and livestock water supply. There has also been extensive degradation of water resources due to weak catchment management, pollution control and water allocation mechanisms.

Degradation of water resources

Over-abstraction of surface water in some parts of the country, inappropriate land use changes, soil erosion in catchments, and deterioration of riparian lands causing flash floods, turbidity, and siltation of water courses and storage facilities have led to serious degradation in the quantity and quality of the water resources. Poorly controlled discharge of effluent from industry and sewage outfalls, and excessive nutrient and agrochemical pollution from rural sources has impacted negatively on the quality of water. The dramatic reduction in the depth of Lake Baringo, from over 15 metres in 1921 to an average of 1.8 metres today is due not only to reduced inflows but also to the increased sediment load from surrounding unprotected and degraded catchments.

HIV/AIDS

HIV/AIDS is also causing untold suffering, particularly for those living in the rural areas. The challenge for the GoK is to ensure access to water, among many other needs, by these vulnerable members of the society so as reduce water related ailments and improve their standard of living.

Water Sector Reform

In recognition of these issues and challenges, the Government has initiated a process of reform for the entire water sector. The sector is being transformed in line with national policy as outlined in the national Poverty Reduction Strategy Paper, the Economic Strategy for Wealth and Employment Creation and the Water Act of 2002, in an attempt to meet the Millennium Development Goals (MDGs).

This National Water Resources Management Strategy (NWRMS) was prepared to outline the objectives and strategies that address the major issues and challenges currently facing Kenya. The Strategy appreciates that integrated water resources management must be elevated and recognized as a national priority, which underpins all of Kenya's social and economic development, and requires massive investment.

1.2 Policy Direction

1.2.1 The National Water Resources Management Strategy as defined by the Water Act 2002

The fundamental objectives for managing Kenya's water resources are enshrined in the Water Act (2002). Sections 11(1) and 11(2) define the National Water Resources Management Strategy in accordance with which, the water resources of Kenya shall be managed, protected, used, developed conserved and controlled. The strategy shall prescribe the principles, objectives, procedures and institutional arrangements for the conservation and control of water resources including:

- Classifying water resources
- Determining the requirements of the reserve for each water resource
- Identifying areas designated as protected and groundwater conservation areas

1.2.2 Water Policy - Sessional Paper Number 1 of 1999

Sessional Paper Number 1 of 1999 on National Water Policy on Water Resources Management and Development provides the policy direction to address the above mentioned challenges. The policy directions include the following:

- Treat water as a social and economic good
- Preservation, conservation and protection of available water resource
- Sustainable, rational and economical allocation of water resources
- Supplying adequate amounts of water meeting acceptable standards for the various needs
- Ensuring safe wastewater disposal for environmental protection
- Developing a sound and sustainable financial system, for effective and efficient water resources management, water supply and water borne sewage collection, treatment and disposal

1.2.3 The Kenya Economic Recovery for Wealth and Employment Creation Strategy (2003-2007)

The Kenya Economic Recovery for Wealth and Employment Creation Strategy (2003-2007) recognizes that the current institutional arrangements are inappropriate and form a bottleneck to achieving the set poverty reduction objectives. It proposes adopting a programme approach to the water sector, putting a strong emphasis on providing services to the poor while ensuring adequate water for the various competing demands. It therefore, proposes to undertake comprehensive institutional reform to facilitate "pro-poor water and sanitation programmes".

1.2.4 The Poverty Reduction Strategy Paper

The Poverty Reduction Strategy Paper (PRSP) recognizes that water is a basic need and an important catalyst for both economic and social development of the country. It states that "access to water for human consumption, agriculture, and livestock use is a major problem in rural areas." It is thus paramount to improve the living standards of the rural communities through the provision of sustainable water resources which will be used productively. Families will be accorded disposable income which will be used in educating their children, providing them the base for a bright and healthy future, thereby breaking the poverty cycle.

2 National Water Resources Management Strategy Formulation

The overall principles adopted in the formulation of the National Water Resource Management Strategy are:

- To achieve equitable access to water, that is, equity of access to water services, to the use of water resources, and to the benefits from the use of water resources.
- To achieve sustainable use of water by making progressive adjustments to water use with the objective of striking a balance between water availability and legitimate water requirements, and by implementing measures to protect water resources.
- To achieve efficient and effective water use for optimum social and economic benefit.

Specific principles adopted are:

- Water is regarded as an indivisible national asset. The national government will act as the custodian of the nation's water resources and its powers in this regard will be exercised as a public trust.
- Water required to meet basic human needs and to maintain environmental sustainability will be guaranteed as a right, whilst water use for all other purposes will be subject to a system of administrative authorisations.
- The responsibility and authority for water resource management will be progressively decentralised by the establishment of suitable regional and local institutions. These will have appropriate community, racial and gender representation.
- Productive use of water resources so as to improve the living standard of beneficiaries and the economy as a whole.
- User pays and polluter pays principles.

3 Goal and objectives of the National Water Resources Management Strategy

The overall goal of the National Water Resources Management Strategy is to eradicate poverty through the provision of potable water for human consumption and water for productive use. The fundamental objectives for managing Kenya's water resources are to achieve equitable access to water resources and their sustainable and efficient use.

The specific objectives are:

(i) To improve water resources assessment so as to obtain more accurate figures of the annual freshwater safe yield of surface water and groundwater resources.
The estimates for renewable water are 19.6 BCM per annum and 2.1 BCM per annum for surface water and groundwater respectively. The water resources assessment should include appropriate mechanisms for data acquisition, storage and sharing.

(ii) To put in place mechanisms that promote equal access to water for all Kenyans
There is need to develop mechanisms that will involve all stakeholders in the planning and development of water resources so as to ensure that every sector, including the poor, has appropriate access to water. Water use is currently characterised by increasing competition within and between sectors due to increasing demands. Furthermore there are conflicting demands from different sectors that makes allocation between different users a major issue. Small scale users have not been able to access the resource even though such water resources may have been developed in their vicinity.

(iii) To enhance and strengthen roles of gender in Water Resources Management

A gender approach in water resources management is based on the rationale that, men and women have differences with respect to needs interests, opportunities and power. In the development process both men and women should be active participants and women should not be viewed as passive recipients or as a vulnerable group along with children and the handicapped. The main feature of the gender approach is that the different roles and responsibilities of men and women are taken into account. It is recognised that men and women do not have the same access and control over resources.

(iv) To create mechanisms for an integrated approach to land and water resources planning and management on a catchment basis

It is noted that there is currently a lack of integration of land and water use at the planning stage resulting in the mismatch of resources and demands on a catchment basis. Degradation of catchments is resulting in serious siltation of rivers and reservoirs. Water pollution control and catchment rehabilitation should also be taken seriously. Pollution can severely degrade and render water resources unsuitable for any use.

(v) To put in place measures that enhance the availability of water resources of suitable quality and quantity where and when it is needed

It is now widely recognised that water is a finite and vulnerable resource. Although water can be renewable, it is often in declining quantities due to pollution, siltation of river systems and non-conjunctive use of surface and groundwater. The increases in population have led to an increase in wastewater and decrease in quality thereby necessitating some form of recycling. Furthermore, the country's water resources are not evenly distributed both temporally and spatially. This has necessitated the development of water resources for use in distant downstream areas due to the mismatch between the suitability of dam sites and the suitability of land to which the water could be put to use. Conveyance systems have often led to huge losses resulting in lesser volumes becoming available for use.

(vi) To put in place strategies that will promote the production of accurate data on water use and demand for both surface water and groundwater

Data on water use and demand has been inadequate in both quality and quantity due to limited financial and human resources, thereby restricting the pace at which development and investment decisions can be made. There is need to streamline the permitting process to involve stakeholders, such as CAACs and WRU Associations.

(vii) To provide guidelines for private sector financing in the water sector as well as to improve opportunities for self financing and amelioration of public sector financing

There has been dwindling government investment into water resources management due to its low profile. The environment for participation of the private sector, civil society and communities in the management and development of water resources.

(viii) To develop water pricing policies and mechanisms which recognise water as an economic good

There is need to recognise water both as a social and economic good. This necessitates the development of appropriate tariff structures and cost recovery measures.

(ix) To develop policies and mechanisms on disaster management

Floods, droughts, landslides and man-made disasters (including chemical spills) create severe stress on the people and economy and on already over-taxed water resources. Historically, disaster management was not viewed as an integral part of development planning and water related disasters were responded to in an ad hoc manner when they occurred. There is inadequate WRM related disaster management capacity in terms of facilities, information, manpower and funding. Poor land use practices, deforestation and catchment degradation exacerbate the effects of floods and droughts.

(x) To promote integration of sector and regional water policies

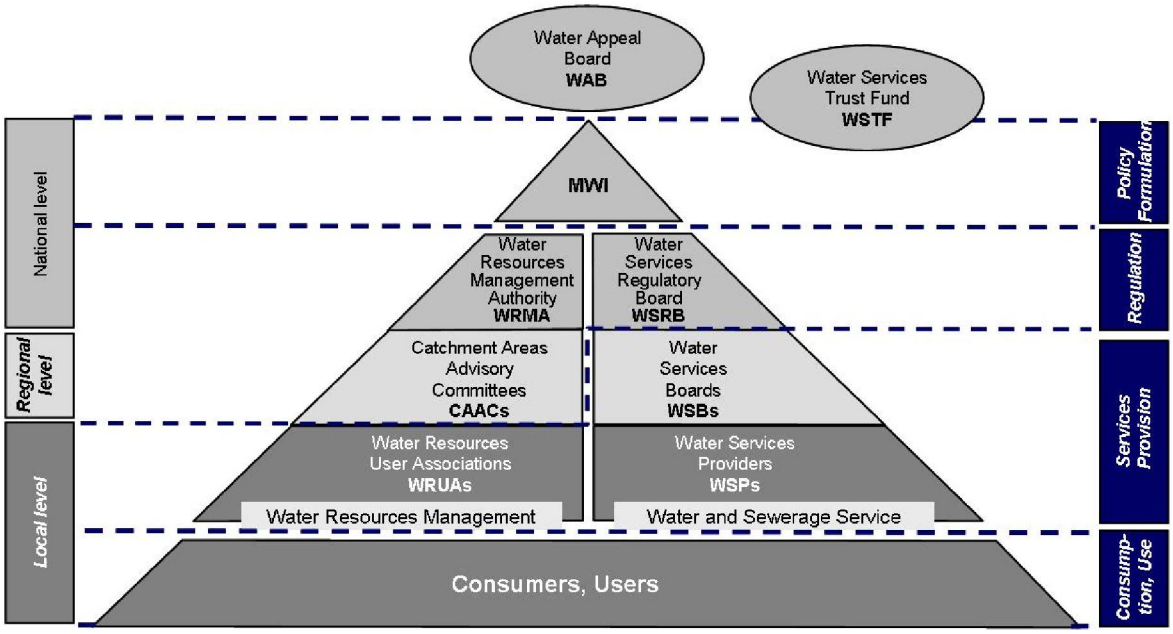
Regional and sectoral policies have often been developed in isolation. As a result, national policies are often at variance with regional and sectoral policies instead of complementing one another.

4 Institutional Framework

The main thrust of the reform is to separate water resources management and development from water services delivery, focussing the Ministry's role on policy formulation, implementation and monitoring; leaving the detailed regulation to a number of parastatal bodies who report to boards that represent different stakeholders' interests. The provision of water services, by water service providers, both from the private and NGO sectors, is to be market driven. Once the reform is complete, the Local Authorities will have to compete with other potential service providers. It will be the responsibility of the newly established institutions, working in concert with Local Authorities, CBOs, NGOs, and the private sector, to ensure the implementation of the strategy.

4.1 Institutional set-up

A schematic representation of the institutional framework under the Water Act 2002 is shown below.



4.2 Roles and responsibilities

The roles and responsibilities of these institutions are as tabulated below:

Institution		Roles and responsibilities
1.	Ministry of Water and Irrigation (MWI)	• Development of legislation, policy formulation, sector coordination and guidance, and monitoring and evaluation.
2.	Water Resources Management Authority (WRMA)	• Planning, management, protection and conservation of water resources. • Planning, allocation, apportionment, assessment and monitoring of water resources. • Issuance of water permits. • Water rights and enforcement of permit conditions. • Regulation of conservation and abstraction structures. • Catchment and water quality management. • Regulation and control of water use. • Coordination of the IWRM Plan.
3.	Catchments Area Advisory Committees (CAACs)	• Advising WRMA on water resources issues at catchment level.
4.	Water Resource Users Associations (WRUAs)	• Involvement in decision making process to identify and register water user. • Collaboration in water allocation and catchments management. • Assisting in water monitoring and information gathering. • Conflict resolution and co-operative management of water resources
5.	Water Services Regulatory Board (WSRB)	• Regulation and monitoring of Water Services Boards. • Issuance of licenses to Water Services Boards. • Setting standards for provision of water services. • Developing guidelines for water tariffs.
6.	Water Services Boards (WSBs)	• Responsible for efficient and economical provision of water services. • Developing water facilities. • Applying regulations on water services and tariffs. • Procuring and leasing water and sewerage facilities. • Contracting Water Service Providers (WSPs).
7.	Water Service Providers (WSPs)	• Provision of water and sewerage services
8.	Water Services Trust Fund (WSTF)	• Financing provision of water and sanitation to disadvantaged groups.
9.	The Water Appeals Board (WAB)	• Arbitration of water related disputes and conflicts.
10.	National Water Conservation and Pipeline Corporation (NWCPC)	• Construction of dams and drilling of boreholes
11.	Kenya Water Institute (KEWI)	• Training and Research
12.	National Irrigation Board (NIB)	• Development of Irrigation Infrastructure

5 Strategies

The Strategy provides direction to the water sector as a whole and the relevant water institutions in particular on ensuring water availability in an environmentally acceptable and sustainable way. It takes into account the needs of the sector and the availability of financial, human and other resources. The NWRMS provides a framework for the development of a Catchment Management Strategy (CMS) for

each of the catchments. The CMSs will include procedures for water resources management. Note that the CMSs should be consistent with the NWRMS.

5.1 Improving Water Resources Assessment

The strategy is to develop a water resources assessment and monitoring system, based on a catchment approach that includes appropriate data and information dissemination systems. The current limited assessment of water resources shall be expanded within ten years to cover the entire country. The main indicator for achievement shall be the publication of an annual water resources assessment report for the entire country. Institutional set-up and the strengthening of capacity (human resources and material/equipment) and the definition of roles and responsibilities are crucial to avoid duplication and to build lean, effective and efficient water resources management institutions.

5.1.1 National Classification of water resources

Kenya's water resources are not uniformly distributed in space and time and in terms of quantity and quality, and therefore it is not economically feasible or desirable to protect and utilize all water resources to the same degree. There is therefore need, for management purposes, to have a classification system of water resources. In this regard the water resources classification system shall categorize water resources into various management classes, each representing different levels of protection and utilization.

Components of the National Classification system will include:

i) An inventory of all surface water and groundwater resources.
ii) The assignment of a management Class to all the inventorised water resources.
iii) An inventory of all existing water users and uses, noting quantities used, quality and purpose.
iv) The specification of measurable parameters such as chemical and bacteriological quality for each class of water.

Targets, to be outlined as resource quality objectives (RQOs), will be set to guide the management of water resources. These will be a function of the management Class agreed upon for a particular water resource, or geographical component of the water resource. The RQOs may be seen as goals to aim for if the management class represents an improvement on an impacted resource; or thresholds or safety nets that represent the limit of acceptable impact. They may be numeric or descriptive and could include any requirements or conditions that may need to be met to ensure that the water resource is maintained in a desired and sustainable state or condition. In determining management objectives for the resource, a balance must be sought between the need to protect and sustain water resources on the one hand, and the need to develop and use them on the other.

5.1.2 The Reserve Water

The reserve water is the quantity and quality of water required to satisfy basic human needs, for all people who are or may be supplied from a particular water resource, and to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the water resource. It has priority over all water uses and the requirements of the Reserve must be met before water can be allocated for other uses. For cases where water is already allocated for use the requirement of the ecological reserve may be met progressively over time.

Strategies for the Reserve Water include:

i) Analysis of existing surface water and groundwater data in terms of quantities and the existing water allocations.
ii) Determination of projected domestic water demand.
iii) Developing methods and capacity for the determination of reserves.

iv) All existing water allocations shall be reviewed to ensure that the reserve water is catered for.

5.2 Putting in place mechanisms that promote equal access to water for all Kenyans

Equal access to water for all Kenyans shall be recognised as one of the most immediate issues to be addressed and this requires water allocation options that promote equal access to water for all. The options for promoting equal access to water are guided by viewing water resources objectively as a "common-property" resource.

5.2.1 Legal and Institutional Provisions

The strategy is to develop and strengthen Legal and Institutional provisions so as to ensure that water resources are managed effectively and efficiently and within the law. There are many organizations involved in water resource management in the country. These organizations include the Ministry in charge of water affairs, other Government Ministries, State Corporations, and Local Authorities etc. These organizations have been constrained in the management of water resources by institutional weaknesses, including poor organizational structure, non-existence of certain institutions, conflicting or overlapping functions and responsibilities, bureaucracy, inadequate funds, lack of skilled personnel and shortage of essential facilities.

5.2.2 Water allocation

Water allocation shall be considered at two stages: planning and management

i) Planning stage - to be considered in allocating water at the planning stage are:
- Human requirements (Basic Human Needs – BHN)
- The Environment (including the Reserve)
- Agriculture
- Energy
- Urban, industrial and mining

Priorities should not be considered when allocating water at this stage. What the plan does is to allow for sufficient water for each sector up to the end of the planning horizon. The reserve is eventually distributed amongst the other four water use sectors.

The inevitability of droughts must also be considered when allocating water at the planning stage. It does not make sense to specify the absolute quantity of water each sector receives, since in many years there may not be enough water to meet all requirements. A more sensible approach is to specify each sector's respective share of the mean average runoff (MAR), with the absolute amount each gets tied to how much is available in a particular year.

ii) Management stage: the two scenarios identified at the management stage are when there is (a) sufficient water and when there is (b) insufficient water to satisfy all the catchment water requirements.

a) Water allocation when there is sufficient water

Permits are issued for the water available for allocation based on stakeholders proven requirements for annual use whether for agriculture, urban, industrial or mining purposes. There is no need to introduce any prioritisation as the water requirements of every user are satisfied, but with the provision that it can be amended in the future if necessary. Very little management is required.

b) Water allocation when there is insufficient water

The key challenge for this management scenario is to identify water allocation strategies that promote equitable distribution of the scarce resource and thereby avoid conflict. Three strategies that are considered are the prioritisation of water use, reallocation and fractional/proportional allocation.

iii) Water use of strategic importance: Water will be set aside for water uses of strategic importance, i.e. water uses that are considered of critical importance to the social and economic wellbeing of the nation. An example of such a water use is water required for electricity generation, including hydroelectric, coal fire and other power plants. Hydropower plays a dominant role in the supply of electricity and contributes over 70 % of the average consumption of 127 Kwh per capita. Water may be set aside for such purposes once the quantities of water available for allocation (including the Reserve) in a catchment have been made.

5.3 Gender in Water Resources Management

The contemporary approaches towards women in the development process focus on the socially determined roles and responsibilities that are diverse and dependent on specific socio-cultural settings that are dynamic. Women were generally viewed as being outside the development process into which they must be integrated. However, this approach marginalised the issues because it dealt with women-only issues with men not being actively involved. As a result either the issues were relegated to women's organisations, desks set up specifically for women or to specialists, resulting in the marginal improvement of the status of women. In addition, this approach polarised the discussions resulting is social tensions. The contemporary approach views women as closely integrated into the socio-political and economic system characterised by gender inequalities. This has therefore led to the mainstreaming approach as the main strategy for improving the status of women.

Mainstreaming means that women must be given the opportunity to fully participate and benefit from development. This strategy will promote the objective of equality and ensure that women are not passive recipients of development. The approach requires that women issues should not be dealt with as separate issues but as part and parcel of the integrated water management issues. The approach has two main focuses i.e. integration and agenda setting. Integration involves widening the gender concerns across many sectors, while agenda setting aims at transforming the existing development agenda with a gender perspective. The involvement of women in decision-making is a key strategy.

Key approaches to ensuring the mainstreaming approach include:

a) Ensuring that all units and all personnel within the system have the responsibility for ensuring involvement of both men and women in all aspects of programmes and policies. Adequate awareness and skills for planning become critical.
b) Incorporating gender into the planning routines. Gender should not come as a separate component with separate planning routines, but should be included as a normal part of planning routines. It is necessary to develop a methodology that should be incorporated into all planning units at all stages. The most strategic entry points within a planning cycle and planning routines must be identified and necessary tools for utilising these entry points with a gender perspective must be developed.

Gender sensitisation is important at all levels but above all at the decision-making levels. To remove the stereotyping and the regressive notions on women's involvement in the water sector, it is important that people are sensitised on the different needs, opportunities and constraints of men and women in the water sector.

5.4 Mechanisms for an integrated approach to land and water resources planning and management

Land use activities have an impact on the water resources affecting both the quantity and quality of the water. However, the present land and water use planning approach is not overly integrated. It is based on administrative boundaries and not on ecological units or natural catchments and this has resulted in a number of problems which include; massive land degradation, soil erosion and subsequent siltation of river systems arising from poor land/water use planning; full development opportunities are not captured e.g. dams were constructed without full analysis of multiple uses to which the water could be put; and fragmented planning and lack of proper role identification has led to uncoordinated development activities. Duplication of projects and efforts has also led to sector conflicts and confusion among stakeholders.

5.4.1 Integrated Catchment Planning

Integrated catchment planning involves the assessment of land, people and water resources in an interactive environment along natural river flow boundaries or catchments.

The new thrust in land/water use planning should be to use river catchments/basins as the planning unit. It is therefore important that various planning authorities adopt the catchment as the planning unit to enhance co-ordination and avoid duplication of services. This approach requires adequate stakeholder participation in all planning phases. However, due to the extensive nature of the catchments, usually covering tens of thousands of square kilometres, there is need for decentralising management structures to the lower tier such as the sub-catchment to facilitate catchment planning.

For effective stakeholder participation in planning, the users must be aware of the issues, concepts and principles in catchment planning. Water should be used to intensify land use, and so improve land productivity in order to absorb the pressure on the land resources. Multi-disciplinary teams of various experts should combine efforts and skills to plan for land and water resources in an integrated manner. Flexibility should be allowed so that catchment plans capture and accommodate both spatial and temporal diversity. Catchment planning is expected to be responsive to the needs of the users and should be relevant to the socio-economic situation of the area.

5.4.2 Legislative measures

The approach involves specification of environmental and/or emission standards, and the behaviour of waste producers. The legal requirements are laid down in the Water Act. It is generally acknowledged that strict regulations and controls are absolutely essential for the protection of the environment. It may be necessary to introduce such devices as “on-the-spot” fines but it needs to be complemented by effective negotiation of environmental requirements, acceptance of responsibility by stakeholders for maintaining environmental quality and effective internalisation of environmental costs.

5.4.3 Pollution prevention approaches

The pollution prevention approach to water quality management involves reducing pollution at the source, recycling of waste to reduce the quantity and/or toxicity and to minimize present and future threats posed by hazardous substances to human health and to the environment. Polluters should take voluntary action towards reducing pollution at source through waste treatment and introduce recycling in their production systems. For hazardous pollutants that pose severe threats to the environment due to toxicity, persistence and extent of bioaccumulation, a precautionary approach should be adopted aimed at minimising or preventing entry of such substances to the water environment.

Remediation strategies will be developed at the catchment level to address the measures required to effect the improvement in the condition of degraded and impaired water resources, or contaminated

land areas. Clean-up levels and targets, remediation approaches and measures, as well as prioritisation of remediation focus and effort, will be primarily dictated by appropriate risk-based approaches. However, rule-based best management practice measures could be appropriate and a requirement in some cases. The repair or rehabilitation of aquatic ecosystems will receive priority.

5.4.4 Control of invasive alien vegetation

Invasive alien vegetation is undesirable because they impact on biodiversity, ecological functioning and the productive use of land. There is evidence that they use more water than the natural vegetation they replace, and can result in significant reductions in runoff and groundwater recharge in some of the catchments where they occur. The management of invasive alien vegetation must be approached in a co-ordinated multi-sectoral way. Where it is deemed to be to the benefit of water resources, biodiversity or land management, alien plants will be removed from public land. Private land owners will be encouraged to take responsibility for the control of alien vegetation on their property. Punitive measures may be taken against landowners that fail to manage, or remove when ordered to do so by the relevant authority, alien vegetation on their property. Punitive measures may be fines, or a reduction of water use allocation comparable to the losses ascribed to alien invasion on the property in question.

5.5 Measures that enhance the availability of water resources of suitable quality and quantity

A number of strategies can be adopted to ensure the availability of water resources for humans, agriculture, industries and mining. The approach to water resources development in Kenya has been based on enhancing security of supply through the provision of more dams and this traditional supply-oriented approach to meeting increased water demand is not sustainable. It is therefore important to consider managing the demand of water to ensure sustainability. The key challenges are to establish priorities and strategies to encourage more efficient and productive use of water and to reshape institutions to better suit the new era of water constraints. The principal strategies for water demand management can be categorized as market-based, technology based or mandatory. Public awareness campaigns directed at both the water users and the legislators on the benefits of water demand management; and how the stakeholders can contribute to its successful implementation, complement these.

5.5.1 Market based strategies

a) Water Pricing

The most important tool of the market-based strategies for water demand management is water pricing. This is so because water consumption for all uses is somewhat sensitive to price. More efficient water use in all sectors can therefore be promoted by adopting a water pricing policy that is based on the user pays principle where the user pays the full economic cost of water.

It should be recognised that since industrial and agricultural water price elasticities tend to be higher than those for domestic consumption, a given water price increase will tend to provide a greater incentive to the former users to conserve water. It should also be pointed out that when users are charged the full economic cost of water, it is obviously possible that the price could be out of the reach of some users. This may therefore require special treatment of low-income users through targeted subsidies. This issue is further elaborated under strategies for pricing water.

b) Effluent Charges

Industrial effluent charges based on the “polluter pays” principle have significant effects on the use of water by industries. The efficient use of water in industry is mainly driven by industrial effluent or pollution charges to protect the environment from degradation. The “polluter pays” principle should therefore be applied in its entirety. This should include a monitoring charge for managing discharge

permits, an environmental charge that will be based on the quality of effluent, applying a standards based approach, and a penalty charge for transgression.

5.5.2 Technology-based Strategies

a) Reduction of Unaccounted for Water (UFW)
Unaccounted for water should be reduced through a comprehensive program. This program consists of universal metering for both production as well as for sales, leak detection programs, updating system mapping to discover which users have legal connections and which do not, improved maintenance, and long-term replacement programs for old installations. The potential gains from a comprehensive program to reduce UFW are unlikely to be realized without substantial financial resources that will be required to implement the various elements of the program.

b) Recycling of Water
Recycled water should be considered as a new, additional source of water that can defer investments necessary to augment the water supplies particularly for local authorities.

c) Conjunctive use of water
Conjunctive use of surface and groundwater should be encouraged. This means that during the wet season when there is surplus surface water, communities should rely on surface water. This would allow time for the groundwater resources to be recharged, which can then be used as a buffer during the dry season.

d) Water Demand Management in the Agriculture Sector
Since the agricultural sector accounts for a large proportion of water use in Kenya, introduction of water demand management in this sector is imperative. More efficient irrigation approaches and technologies should be adopted. These include:

(i) Assessing the irrigation potential of soils in terms of water loss. This includes determining soil texture, moisture retention properties and the slope and then choosing the more water efficient soils.
(ii) Identifying the suitable water saving technology and the efficient production level.

5.5.3 Mandatory Strategies

Mandatory measures can be used to supplement the economic and technical measures. These include the ban on the use of hose pipes and water closures. Their biggest weakness perhaps is that they do less well than the other strategies to encourage more efficient use of water resources since they are more costly in terms of information requirements, staffing and enforcement than the other options to meeting similar objectives.

5.5.4 Public Awareness

The success of a water demand management program will depend on user cooperation. The stakeholders must understand the need for water demand management. Many urban consumers have no knowledge of their water source, supply capacity or availability, and necessary treatment and distribution costs. Conditions or problems of concern should be communicated to key community leaders, who play a significant role in establishing the program goal. The goal of most public awareness programs in the field of water demand management is the development of a conservation ethics among water users. Long-term results in eliminating wasteful water-use habits are best achieved by educating young people. Teaching children to respect the value of water will help them grow into responsible adults with a conservation ethic. A good place to begin this education programme is in the schools.

5.5.5 Development of Water Resources

The aim of this strategy is to maintain storage of water through construction of conservation works to ensure sustainable availability of water. The strategy shall be to formulate a National Water Resources Management Infrastructure Development Programme to promote water conservation and to meet the current and future demand. Regarding enhancing groundwater storage for example, artificial recharge of aquifers needs to be considered.

5.6 Production of accurate data on water use and demand for both surface water and groundwater

The availability of reliable data and information on all aspects of water resources management is fundamental to the successful implementation of strategies. No proper decision on any matter can be made unless it is informed by reliable, relevant, up-to-date information.

Accurate data on surface water and groundwater resources has been inadequate in both quality and quantity due to limited financial and human resources, thereby restricting the pace at which development and investment decisions can be made. As part of the strategy:

i) The National Water Resources Management Authority shall review and, where necessary, revise all data acquisition, monitoring and information arrangements to ensure that all relevant data is collected, verified and stored, and that there is consistency in the data that are common to the various water resources management functions. At the same time, the facility to analyse data and provide information in different ways to meet specific requirements will be retained and improved.

ii) National systems will be designed in such a way that catchment/river basin management institutions/agencies, once established, will be able to take an appropriate level of responsibility for managing information relevant to their water management areas and, where necessary and feasible, have access to information from adjacent areas with which there are links. Information systems in a water management area will nevertheless remain part of the national system so that information is available at national level.

5.7 Provide guidelines for financing in the water sector

In the past, the water sector has relied heavily on the exchequer for financing. However, over the years, with declining resources, the sector has suffered from inadequate funding. Water has also not been recognized and considered as an economic good hence consumers have been paying for treatment and delivery services only. Consequently, the sector has not been able to meet its obligation in conservation, monitoring, protection and exploration of water resources thereby constraining WRM activities. The strategies to provide funding shall be to:-

- Devise a phased financing system to support WRM activities, which are multi-sectoral by nature. This shall include licensing for water, charging appropriate levies and charging the economic value of water. Other areas for financing are the following:
    i) Government Financing: The government resources, broadly defined to include the quasi government and donor resources, will continue to play an important role in the development of the sector. The sources of government financing will continue to be from general taxes, voted to the water sector through the government budget. However, due to the tight fiscal policies it becomes crucial to streamline and rationalize government financing to those areas which can not be operated on a commercial basis. Government resources should support the targeted subsidies of the sector and the basic needs particularly the primary water supplies in the rural areas. In line with PRSP, the government and donor finances will be directed to the sector through WSTF. The key strategy is to streamline expenditure and avoid unnecessary subsidization.

ii) Commercialisation of the Water Utilities: Commercialisation is a concept that requires that activities undertaken are able to pay for themselves attaining a self-financing status. Utilities operating in the water sector both at the local authority and parastatal level have to operate on commercial basis. Commercialisation will improve the capacity for generating internal resources to meet the operations of the sector and also accessing other sources of funding. Commercialisation also requires rationalization of functions, clearly separating those that are of a statutory or regulatory nature from those that are commercial. The streamlining of functions is important because it provides an opportunity for government to target its constrained resources to the needy and vulnerable groups. Support from government would therefore be effectively directed to the disadvantaged groups complementing the commercial operations of the sector.

iii) Money Market Financing: The money market is also another source of funding that can be used by both the private sector and the government. This source of funding has not been extensively used for water sector development by government. Funds can be raised through bonds or commercial loans, e.g. micro-finance schemes. Opportunities have to be created to allow such funding to be accessible to water related institutions. Commercialisation also plays an important role in facilitating this source of funding because financiers and lenders want to be assured that their money will be paid back However, money market funds will only be available for those operations or activities that can generate resources for repayment purposes.

iv) External Funding: Funding of development programs through external resources will continue to play an important role in the development of water resources. These funds can be in the form of concessionary loans, grants or commercial loans. Concessionary loans and grants can be obtained at relatively low cost through government to government agreements and are normally designed to benefit the disadvantaged groups. Funds should also be used to meet the targeted subsidies of the sector. There is need for clear guidelines on policies and procedures for the targeted subsidies to facilitate proper use of such funding. Ideally the donor resources should be seen as temporary resources or resources to facilitate kick-starting development in areas that may not otherwise be supported.

- Implement the polluter pays and polluter approves principles. The polluter pays principle requires dischargers of effluent to meet the cost of treating their effluents and of repairing the consequences to the environment of their discharges.
- Create attraction for private sector involvement and donor funding. The nature of the private sector participation envisaged will be largely in the form of public-private sector partnerships. The companies bring in management expertise, technical skills and credit standing to finance investments. A mutually beneficial partnership is built between the public and private sector to ensure that consumers ultimately get the best service possible within the means available. The partnership can be fulfilled in different forms, such as service, management, and lease contracts, concessions and joint ownership.
- WRMA shall endeavour to support WRUAs. In this respect provision shall be made to enable them to access the funds provided by the WSTF for management and development within their areas of jurisdiction.

5.8 Developing water pricing policies and mechanisms which recognise water as an economic good

Pricing plays an important role in the financing of the water sector as well as in promoting the efficient utilisation of water resources. Current pricing policies have not significantly contributed towards the financing of the sector both for recurrent and investment purposes. Social and political considerations outweighed the economic considerations in the setting of tariffs such that water is largely considered a

social good. The low tariffs for both urban and rural domestic water supplies do not promote efficient utilisation of water, environmental conservation and preservation. With the increasing pressures on the water resources the need to have a different view on the pricing of water becomes urgent. Increasingly, water is now viewed as an economic good. Nationally, water availability does not coincide with population concentrations and incidences of water pollution are on the increase. As a result, and within the context of the water sector reforms the government now acknowledges that water is an economic good that has to be preserved and conserved.

Guidelines and procedures for stakeholder consultation, subsidies and price increases have to be clearly provided to promote the implementation of the strategy. In order to gain acceptance, the water pricing system should be developed with the full consultation of water users.

Market forces while being one way of setting prices rarely establish the price of water. The social and cultural value and the fact that water is a public good are factors that negate the role of market forces in water resources management. Water prices are therefore set by public or quasi- government agencies or regulated through private utilities. The strategies considered are therefore based on an administered pricing system. The pricing system agreed incorporates the user pays principle.

5.8.1 The Average Cost Pricing

The average cost pricing involves determining the capital costs and operation and maintenance costs of all dams (government) and dividing by the yield (at various risks for the different sectors). This will either give a:

a) National Average Price (National Blend Price)

The unit price of water is uniform throughout the country regardless of climatic zone or whether it is a new or old project. The system is characterised by an inherent cross subsidy between old and new schemes. The blend price system does not signal the true cost of water to the consumer and hence compromises the incentive for efficient utilisation of water. It also involves considerable cross-subsidisation - not benefiting the intended beneficiaries i.e. communal (rural) and low-income urban households. The use of the blend price allows for the construction of non-viable schemes to be masked and gives little incentive for any scheme to operate on commercial lines. An advantage of the blend pricing is that it allows for the development of water resources in areas without adequate resources. It therefore can afford disadvantaged communities a chance to have access to water albeit that the schemes may not always be viable, or

b) Catchment/River Basin Specific Blend Price

This is an intermediate position between the national blend and the site specific pricing systems. The price of water is obtained by dividing the total sum of total annual costs (full cost recovery) for all government water projects in the catchment area by the volume of water sold. A uniform price would therefore be applicable to the consumers of that catchment. The main advantage of the system is that it reduces the cross subsidy element to a smaller geographical area. It still however suffers the same disadvantages as the national blend system in that it does not signal the true cost of water to the user. The conservation and efficiency objectives will thus be compromised. The system will result in differences in the price of water between different catchments. In the drier areas, the costs of development are bound to be higher because of the lower yields due to low rainfall endowments. Such a system would need a strategy of assisting the low rainfall areas for improved water availability.

c) Site Specific Pricing

In its truest form, the user pays principle requires site specific pricing. This option embraces the principles of cost recovery where the price would cover maintenance, operation and capital cost

recoveries and sector self-financing to cover all water services. This strategy reflects the true user pays principle and embodies the marginal pricing concept that is key to the implementation of an economic approach towards water pricing. In this option every scheme is priced separately.

The main advantages of this option are that it satisfies the main dictates of economics in that it provides the correct signal of the cost of water and therefore can promote water use efficiency and conservation. It is also consistent with the long-term vision of the sector that includes achieving greater equity in access to water, improving efficiency of water use, secure financing for operation, maintenance and expansion of supply. The option also ensures that investment decisions made are consistent and systematic in such a way as to enhance national socio-economic development. The option can also be readily adapted to future decentralised management.

The main disadvantage is that cost recovery may not be affordable by all concerned. The likelihood of the projects in the drier areas becoming more expensive is very high and requires strategies of supporting such schemes. The projects in these areas will more often be deemed non-viable and hence may never be implemented. To implement such projects targeted subsidies would therefore be required.

5.8.2 Targeted Subsidies

The site-specific and the catchment pricing systems require targeted subsidies to vulnerable groups if they are to be socially acceptable. The targeted subsidies could include:

- A life-line tariff for a fixed volume of water so as to meet basic needs of poor urban consumers. These would be financed by a cross subsidy from the more affluent consumers. The advantage is that water is made available to all those who need it. The disadvantage is that somebody fixes the basic quantity and it may not be adequate for a big household or maybe too much for a smaller household.
- Temporary subsidies in the form of once off capital contribution to extend water access for productive purposes or kick start potentially viable projects for the rural poor. Beneficiaries pay operation, maintenance and replacement costs. The capital subsidy is to be financed by government through budgetary allocations and donor contributions. The advantage is that the subsidy is not ongoing and beneficiaries also contribute and the probability of benefiting the target group is greater. The disadvantage is that large capital sums may not be readily available.

Basic supplies of clean water for domestic use can also be subject to a capital subsidy but operation, replacement and maintenance costs are to be met by the beneficiaries.

5.8.3 Levies and Fees

The user pays principle requires that users meet the costs of statutory and regulatory functions within the sector. These activities include the administration of the Water Act, the activities of the Water Resources Management Agency and any other relevant agencies. A water levy payable by all water users will be collected at the catchment levels to support the activities of the WRMA and its sister agencies.

5.9 Developing policies and mechanisms for Disaster Management

There should be strengthening of WRM related disaster management capacity in terms of facilities, information, manpower and funding. Poor land use practices, deforestation and catchment degradation exacerbate the effects of floods and droughts.

5.9.1 Floods

Floods occasionally cause disasters in Kenya. The plains of Kano in Nyanza Province, Budalangi in Western Province and the lower parts of the Tana River for example are susceptible to floods. Arid and semi-arid areas of the Country also experience flash floods. In 1997/98 the El Nino phenomenon affected many parts of Kenya causing millions of shillings of damage, destruction to property, loss of lives, famine and waterborne disease epidemics. With inadequate preparation for the El-Nino floods national resources were over-stretched in the response phase.

The El Nino induced floods of 1997-1998 caused some US $ 151.4 Million in public and private property damage. This figure does not include the number of people who lost family members, savings, property and economic opportunities.

Strategies on Prevention and Mitigation include:

i) Formulate policies on settlement in flood prone areas
ii) Improve Catchment conservation and protection so as to retard surface run-off
iii) Develop infrastructure design parameters and regulations to ensure that structures can sustain flooding at the design return periods
iv) Develop flood control infrastructure.

Strategies on Preparedness include:

i) Enhance data recording and information management systems, particularly of extreme events, to enable design for protection against floods
ii) Increase public awareness on dangers of settling in flood prone areas and the need for insurance so as to indemnify losses
iii) Develop flood forecasting and early warning systems at National, District and grassroots levels
iv) Train and build capacity for appropriate response.

Strategies on Response include:

i) Establish institutional framework for flood management at National District and Grassroots levels
ii) Develop funding mechanisms.

The Strategy on Recovery and Rehabilitation is:

i) Establish institutional framework for disaster management i.e. Disaster Operation Centres (DOCs).

5.9.2 Drought

Drought is a recurrent phenomenon that affects large areas and numbers of people in the country. The cumulative effects these droughts include the erosion of assets, decreasing ability to cope with future droughts, impoverishment of rural communities and depletion of the Government coffers. It is, therefore, a priority of the Government to strengthen suitable drought preparedness, mitigation and response structures and activities. The effects of drought have become more pronounced in recent decades: in the 1990s there were three major droughts. Drought causes food insecurity both in the country and also in the region and mechanisms for regional coordination, for example in East Africa are essential to mitigate the effects of drought in the region. Existing structures and approaches are to be adequately coordinated.

Strategies on Prevention and Mitigation include:

i) Undertake catchment management activities so as to improve on soil infiltration and groundwater storage.
ii) Run a public awareness campaign on water saving techniques.

iii) Put in place an advisory services system for drought prone areas to increase resistance to drought effects particularly in such factors as borehole drilling for water supplies etc.
iv) Developed long term strategies for planning and construction of infrastructure to increase the per capita storage of water in critical areas and to ensure food security.

Strategies on Monitoring and Preparedness include:
i) Advise consumers on the need for water storage such as the 90 days storage facilities in case of irrigation water for security.
ii) Provide strategic water reserves.
iii) Enhance appropriate water use management practices including restrictions on use of water for non-essential purposes.
iv) Develop funding mechanism.
v) Set up a monitoring and data collection system for indicative data such as water table levels.

Strategies on Response include:
i) Establish drought management institutional structures at the National, District and Grassroots levels.
ii) Develop food and water supply contingency plans to include local authorities, NGOs, international organisations such as the International Red Cross, United Nations agencies etc. and the army if appropriate.

5.9.3 Landslides

Landslide occurrence in most cases is accompanied by catastrophic event causing heavy losses to both life and property. It is estimated that landslides have destroyed millions of Kenya Shillings worth of property, including coffee and tea plantations and domestic animals during the last ten years in Murang'a district. It is further estimated that in the last twenty years, landslides in one district has caused the loss of over one million cubic meters of soil in an area of 30 km^2. The losses caused by landslides also have a major negative impact on infrastructure such as power transmission, water supplies and irrigation facilities.

Strategies on Prevention and Mitigation include:
i) Put in place appropriate land use management practices that protect vulnerable soils.
ii) Create awareness on vulnerable areas.
iii) Review design criteria in landslide prone areas.

Strategies on Preparedness include:
i) Determine vulnerable areas so as to plan for their protection.
ii) Develop funding mechanisms.

The Strategy on Response is:
i) Establish a mechanism for landslide management at National, District and Grassroots levels.

5.10 Promoting integration of sector and regional water policies (trans-boundary waters)

Kenya shares some of its surface and groundwater resources with neighbouring countries which include Uganda, Tanzania, Ethiopia and Somalia. This therefore means that demands for additional supplies of fresh water from shared river basins will need to be negotiated with other riparian states. There is, however, a lack of accurate knowledge with respect to the state of the water resources within the shared basins and the probable future demands by our neighbours.

Without the correct information, the countries sharing trans-boundary waters will remain concerned about threats to sovereignty, especially when another country (particularly, but not necessarily upstream) is deemed to have that information and is therefore perceived as being privileged.

Strategies for shared international water courses include:

- Improve collaborative WRM by incorporating interests of trans-national stakeholders.
- Establish national institutional framework to address international waters.
- Integrate relevant international conventions and treaties governing the management and administration of international waters into national legislation and policy.

6 Support mechanisms for implementing the Strategy

6.1 Water Sector Institutions

The role of Government

In leading the implementation of the National Water Services Strategy the government shall assume its responsibilities to ensure:

i) Completion of the process of policy development
ii) Mobilization of resources for strategy implementation
iii) Accountability of funds spent on provision of water
iv) Quality assurance of the water provided.
v) Monitor and evaluate activities of sector institutions to ensure sustainability

Water Sector Reform

Implementation of the water sector reform process will comply with the following guiding principles:

i) Robust and independent institutions that adhere to good governance
ii) Devolution of responsibilities for water resources management to the Water Resources Management Authority, Catchment Area Advisory Committees, and Water Users Associations with a particular focus on gender representation.

Engagement of other stakeholders (NGOs, CBOs and Private Sector)

The encouraging and providing of an enabling environment for the engagement of non-governmental organizations (NGO), community based organizations (CBO) and the private sector (see section 4.7) in water resource management will benefit the implementation of the National Water Resources Management Strategy.

6.2 Other areas of support for implementing the Strategy

Capacity Building

The establishment of a lean, efficient and productive workforce who are well trained and motivated and with adequate physical infrastructure and financial resources is required to undertake water resource management for implementation of the National Water Resources Management Strategy

Applied research and technology

This involves the promotion of applied research and the dissemination of findings in support of sound water resources management.

Communication

Communication includes the delivering of messages and informing the public who can effectively participate in the national water campaign for sustainable water resources management. One of the aims is to raise public awareness on water resources management. There is need for a national forum for communication on water issues, e.g. the Kenyan Water Forum.

7 Financing Requirements

Due to the lack of accurate and up-to-date data it is very difficult to do reliable estimates on the funding requirements for the sector. In the Aftercare Study of the National Water Master Plan (1998) the funding requirements for building infrastructure for the water sector (excluding hydropower) to 2010 was estimated at around 208 billion KES. This figure excludes investment into the hydrometric and water quality networks, investment in capacity development, and flood control structures. In the study "Towards a Water-Secure Kenya" (April 2004) it is estimated that about 500 million US$ are necessary per annum over the next 30 years to develop the same per capita water storage capacity as in South Africa that suffers from a similar variable climate. This is about 5% of the present GDP of Kenya.

To establish better estimates and a more realistic approach, it is necessary to develop basin based water management plans. This exercise will start in 2006 for two basins. Based on these plans it will be possible to develop a more reliable and up-to-date breakdown of infrastructure and training costs.