



*Assessment of the level of implementation of
Integrated Water Resources Management
In
Kenya*

**By
Prof. Mwakio Tole**

*Applied Training Project Publications
December 2008*

EXECUTIVE SUMMARY

Water is a vital natural resource to all forms of life and their survival; for mankind, it is the spine of growth and prosperity. The rising demands for it against the limited temporal natural endowment and its increasing scarcity could result in devastating conflicts and catastrophes.

Integrated Water Resource Management is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. Its basis is that the many different uses of water resources are interdependent.

A study aimed at identifying the results of an assessment carried out on the level of implementation of IWRM in the Nile basin countries was commissioned by the Nile Basin Initiative. The Nile basin countries share a common resource, the Nile River. The NBI has a vision on the way the resources of the Nile will benefit the people of the basin, "...to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin resources". This vision can only be realized if the countries manage the water and related resources in an integrated manner hence the IWRM.

The main aim of the study was to provide an assessment of the status of implementation of IWRM in the following aspects of development in the Nile Basin countries:

- General level of recognition of linkages between IWRM and poverty reduction
- General level of recognition of the importance of IWRM as an important tool for water resources planning, development and management
- Level of mainstreaming of IWRM principles in national policies and plans
- Level of mainstreaming of IWRM considerations in the legal framework
- Level of mainstreaming of IWRM considerations in the institutional framework and implementation/enforcement mechanisms

The report also identifies some of the challenges related to implementation of IWRM in the Nile Basin countries. Those challenges include:

- water scarcity, deforestation,
- corruption,
- pollution,
- lack of know how/lagging behind in technology,
- inadequate capacity (human and infrastructure),
- climate variability,
- low investment in storage and transport

This report presents the assessment for Kenya.

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ACRONYMS AND ABBREVIATIONS

CAACs	Catchment Area Advisory Committees
CAACs	Catchments Area Advisory Committees
CBOs,	Community Based Organizations
CMS	Catchment Management Strategy
EMCA	Environmental Management Coordination Act
GoK	Government of Kenya
IWRM	Integrated Water Resource Management
KEWI	Kenya Water Institute
MWI	Ministry of Water and Irrigation
NBI	Nile Basin Initiative
NEMA	National Environmental Management Authority
NGOs	Non- Government Organisation
NIB	National Irrigation Board
NWCPC	National Water Conservation and Pipeline Corporation
NWRMS	National Water Resources Management Strategy
WAB	The Water Appeals Board
WRM	Water Resources Management
WRMA	Water Resources Management Authority
WRUAs	Water Resource Users Associations
WRUAs	Water Resources Users Associations
WSBs	Water Services Boards
WSPs	Water Service Providers
WSRB	Water Services Regulatory Board
WSTF	Water Services Trust Fund

1 INTEGRATED WATER RESOURCES

MANAGEMENT AND THE NIE BASIN INITIATIVE

1.1 Global developments in Integrated Water Resources

Management

Water is vital for human survival, health and dignity and a fundamental resource for human development. The world's freshwater resources are under increasing pressure. Growth in population, increased economic activity and improved standards of living lead to increased competition for, and conflicts over, the limited freshwater resource. A combination of social inequity and economic marginalization forces people living in extreme poverty to overexploit soil and forestry resources, with damaging impacts on water resources.

The Integrated Water Resources Management (IWRM) concept was strongly recommended during the first and only ever, United Nations Water Conference that was held at a high decision-making level at Mar del Plata, Argentina, in March 1977. Some 15 years after the Mar del Plata recommendations, IWRM was again recommended during the International Conference on Water and the Environment, held in Dublin in 1992. Agenda 21 of the Rio Conference gave IWRM a further boost.

The World Commission on Water, which was the main focus of discussion at the Second World Water Forum in The Hague in 2000, was the endorsement of the principle of IWRM. Many presentations at the Johannesburg Summit in 2002 and Third World Water Forum in Japan in 2003 were explicitly based on the IWRM principle. During the Johannesburg Summit (Rio+10), African countries adopted the IWRM concept and decided that their countries would put in place mechanisms to implement IWRM principles in their water management and planning by 2005.

1.2 The Nile Basin Initiative Process

The Nile basin countries share a common resource, the Nile River. The Nile Basin Initiative (NBI) has a vision on the way the resources of the Nile will benefit the people of the basin, "to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin resources". This vision can only be realized if the countries are to manage the water and related resources in an integrated manner hence the IWRM. However before that dream is realized a few challenges will have to be addressed and overcome. The water management is mostly sectoral, with various Ministries dealing with water. The water infrastructure, capacities and capabilities are developed in some countries and weak in others. It is the mandate of the Applied Training Project as capacity building projects to build capacity of the water

sector at all levels so as to enable countries manage water in a holistic manner and make informed decisions.

1.3 Objectives of the study

The main objective of the study was to examine the concept of IWRM and its current implementation status in the real world, critically and objectively for the countries of the Nile Basin. This report presents the case for Kenya. The study was based on the following objectives:

- i. To find out the general level of recognition of linkages between IWRM and poverty reduction
- ii. To find out the general level of recognition of the importance of IWRM as an important tool for water resources planning, development and management
- iii. To identify the level of mainstreaming of IWRM principles in national policies and plans
- iv. To find out level of mainstreaming of IWRM considerations in the legal framework
- v. To find out level of mainstreaming of IWRM considerations in the institutional framework and implementation/enforcement mechanisms
- vi. To identify the challenges related to implementation of IWRM in the country

2 STATUS OF WATER RESOURCES MANAGEMENT IN THE COUNTRY

2.1 Country background information

Kenya is currently having a population of 32 million. This figure is projected to rise to 43 million by 2015. Kenya 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. Kenya is classified as a water-scarce country. The natural endowment of renewable freshwater is currently about 21 BCM (billion cubic meters) or 647 m³ per capita per annum. A country is categorized as “water-scarce” if its renewable freshwater potential is less than 1,000 m³ per capita per annum. By 2025, Kenya is projected to have a renewable freshwater supply of only 235 m³ per capita per annum.

2.2 The water resources of the country

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.

More than one half of the water resources of Kenya especially the surface waters, is constituted by internationally shared water. The Lake Victoria Basin in Kenya contributes about 45% of surface water inflows of Lake Victoria, and proportionately of the upper River Nile. This inter-dependence between Kenya and the other riparian states of River Nile has considerable implications on the management of the country’s major water resources.

The challenge to the management of Kenya’s water resources must 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. There has also been extensive degradation of water resources due to weak catchment management, pollution control and water allocation mechanisms. Over-abstraction of surface water in some parts of the country, inappropriate land use, 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.

2.3 Policy and legal framework for water resources Management

The National Water Resources Management Strategy

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.

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 directives include the following:

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

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

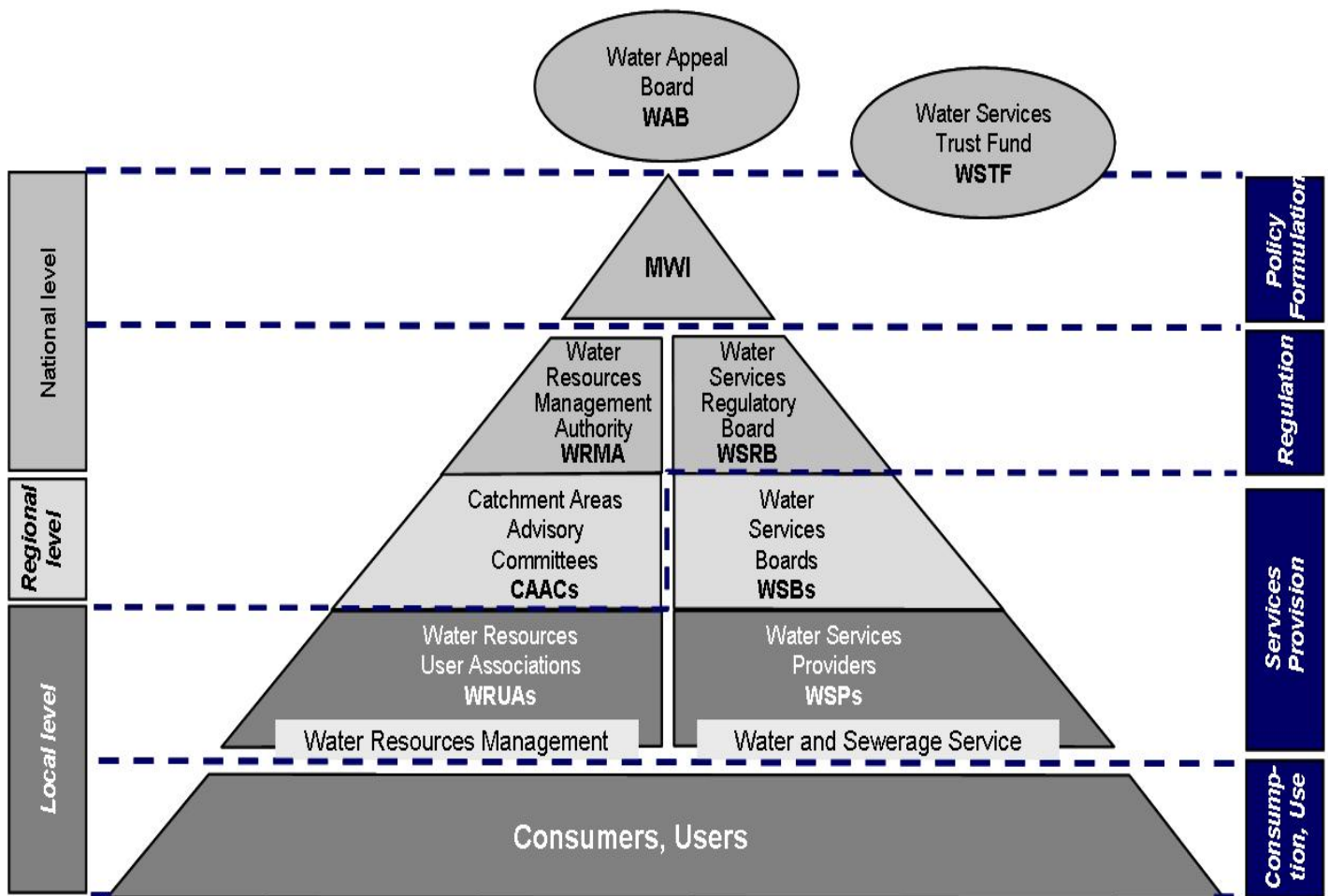
The Kenya Economic Recovery for Wealth and Employment Creation Strategy (2003-2007) recognizes that the current institutional arrangements are inappropriate and form a bottleneck to achieving the set poverty reduction objectives. It proposes adopting a programme approach to the water sector, putting 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".

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.

2.4 Institutional framework for water resources management

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



2.5 Water resources management issues and challenges

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.

Droughts

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.

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 caused the loss of over one million cubic meters of soil in an area of 30 km². The losses caused by landslides also have a major negative impact on infrastructure such as power transmission, water supplies and irrigation facilities.

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.

3 THE IWRM CONCEPT

3.1 *Current definitions and guiding principles*

IWRM is a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. At its simplest, integrated water resources management is a logical and intuitively appealing concept. Its basis is that the many different uses of water resources are interdependent. That is evident to us all. High irrigation demands and polluted drainage flows from agriculture mean less freshwater for drinking or industrial use; contaminated municipal and industrial wastewater pollutes rivers and threatens ecosystems; if water has to be left in a river to protect fisheries and ecosystems, less can be diverted to grow crops. There are plenty more examples of the basic theme that unregulated use of scarce water resources is wasteful and inherently unsustainable.

Integrated management means that all the different uses of water resources are considered together. Water allocations and management decisions consider the effects of each use on the others. The basic IWRM concept has been extended to incorporate participatory decision-making. Different user groups (farmers, communities, environmentalists,) can influence strategies for water resource development and management.

Management is used in its broadest sense. It emphasizes that we must not only focus on development of water resources but that we must consciously manage water development in a way that ensures long term sustainable use for future generations. Integrated water resources management is therefore a systematic process for the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives. It contrasts with the sectoral approach that applies in many countries. When responsibility for drinking water rests with one agency, for irrigation water with another and for the environment with yet another, lack of cross-sectoral linkages leads to uncoordinated water resource development and management, resulting in conflict, waste and unsustainable systems.

Water is vital for human survival, health and dignity and a fundamental resource for human development. The world's freshwater resources are under increasing pressure. Growth in population, increased economic activity and improved standards of living lead to increased competition for, and conflicts over, the limited freshwater resource. A combination of social inequity and economic marginalization forces people living in extreme poverty to overexploit soil and forestry resources, with damaging impacts on water resources. Here are a few reasons why many people argue that the world faces an impending water crisis:

- a. Water resources are increasingly under pressure from population growth, economic activity and intensifying competition for the water among users;

- b. Water withdrawals have increased more than twice as fast as population growth and currently one third of the world's population live in countries that experience medium to high water stress;
- c. Pollution is further enhancing water scarcity by reducing water usability downstream;
- d. Shortcomings in the management of water, a focus on developing new sources rather than managing existing ones better and top-down sector approaches to water management result in uncoordinated development and management of the resource.
- e. More and more development means greater impacts on the environment.
- f. Current concerns about climate variability and climate change demand improved management of water resources to cope with more intense floods and droughts.

3.2 How the concept is understood in Kenya

The World Commission on Water, which was the main focus of discussion at the Second World Water Forum in The Hague in 2000 endorsed the principle of IWRM. Many presentations at the Johannesburg Summit in 2002 and Third World Water Forum in Japan in 2003 were explicitly based on the IWRM principle. During the Johannesburg Summit (Rio+10), African countries adopted the IWRM concept and decided that their countries would put in place mechanisms to implement IWRM principles in their water management and planning by 2005.

The findings of the study conducted all over the country revealed that the local community of Northern Kenya had poor understanding of the following aspects of concept of IWRM:

- a. Water management should be based on participatory approach involving users, planners, policy makers and all concerned parties
- b. Women play a central part in the provision, management and safeguarding of water
- c. Water has an economic value.
- d. The study however showed that Northern Kenya had some level of understanding of the following aspects of IWRM:
- e. Fresh water is a finite and vulnerable resource and should be protected.
- f. The findings revealed that the respondents from Nairobi were not in agreement on whether the local community had an understanding at all or had poor understanding of the IWRM concept that:
- g. Water has an economic value
- h. The respondents also were not in agreement on whether the local community had poor understanding or some understanding of the IWRM concept that:
- i. Fresh water is a finite and vulnerable resource and should be protected.
- j. The respondents were not in agreement on whether the local community had moderate or high understanding of the IWRM concepts that:

- k. Water management should be based on participatory approach involving users , planners policy makers and all concerned parties
- l. Women play a central part in the provision, management and safeguarding of water.

3.3 *The right emphasis: focus on the means or the end?*

If the concept is not easy to implement, what adaptive modifications of this concept are necessary in order to make it more operational and implementable in the particular context of Nile Basin countries? Every operational action can contribute to the integrated management process. Even when implemented at a very specific level, it should be integrated within the management of the whole hydrographic basin. A number of projects already implement certain IWRM components, e.g. the participatory approach, evaluation (social impact study in Cameroon), or financial aspects (privatization schemes in Romania); their experiences provide other initiatives with a solid groundwork. These projects are proceeding step by step, according to their capacities and the local situation, but always keeping the fundamental IWRM principles in mind as framework and guideline.

IWRM is a means to an end: the end being efficient and equitable water management. More emphasis should be placed on the ends themselves, rather than on the means.

3.4 *Implementation challenges*

Some of the challenges outlined by the study as facing the IWRM implementation process in Kenya include the following:

- a. conflict resolution and participatory approach - The hydrographic basin of the
- b. Ewaso Ng'iro River at the foot of Mount Kenya Provides water resources for intensive farming upstream, and for small farmers and nomadic herdsman downstream. Irrigation that does not account for the basin's real water availability, erosion and evapotranspiration on land that has been stripped by farming, threaten these various groups with a growing water shortage. Competition is very high in this semi-arid zone, and the stronger competitor wins. Some large-scale farmers irrigate excessively, and the poorer populations downstream are deprived of the water they need to survive. Water sources are diverted clandestinely at night; conflicts grow more and more frequent.
- c. water scarcity;
- d. deforestation;
- e. corruption;
- f. pollution;
- g. lack of know how/lagging behind in technology;
- h. inadequate capacity (human and infrastructure);
- i. climate variability;
- j. low investment in storage and transport;

- k. catchment conservation and protection,
- l. limited funding,
- m. lack of capacity of staff to deliver services,
- n. lack of proper institutional frameworks, overlapping roles of institutions
- o. lack of water and sanitation data in the country.
- p. Poor dilapidated water structures and systems.

3.5 Recommendations for improvement of the concept

It was recommended that a detailed survey should be conducted to support the results of the survey conducted using the questionnaire as a tool for data collection.

4 IMPLEMENTATION STATUS OF IWRM

4.1 General level of recognition of linkages between IWRM and poverty reduction

The findings of a survey conducted on the stakeholders from the water sector revealed: lack of awareness and access to water is a major contributor of poverty in the country;

- a. lack of funds to reach poor areas;
- b. inadequate water development and accessibility to water;
- c. most water users did not advocate for water as an economic good.
- d. the poor had no access to clean and reliable water source and they had to pay much more.
- e. It was necessary to identify widely acceptable indicators that address poverty alleviation.

4.2 General level of recognition of the importance of IWRM as a tool for water resources development and

Management planning

The findings revealed that the water resources management department, the Ministry of Water and Irrigation and the water resources management authority developed and implemented the water resource management strategy. It is a requirement in the Water Act, 2002 that public consultations are carried out before a policy or strategy is enacted. Priority is given to domestic water use and is pro-poor, equity and environmental reserve applied are some of the key principles

Further research showed that land use activities had an impact on water resources affecting both the quantity and quality. However, the prevailing land and water use planning approach was not overly integrated - being based on administrative boundaries and not on ecological units or natural catchments. This had resulted into a number of environmental problems including massive land degradation, soil erosion and subsequent siltation of river systems arising from poor land/water use planning. Full development opportunities were not captured e.g. dams were constructed without full analysis of multiple uses to which the water could be put. Fragmented planning and lack of proper role identification has led to uncoordinated development activities. Duplication of projects and efforts had also led to sector conflicts and confusion among stakeholders.

4.3 Level of mainstreaming of IWRM principles in national policies and plans

The findings reveal that the policy measures usually used in allocating available water resources among the various sectors and users were permits although there were no policy rules or allocation priorities developed as yet. There existed water resources management rules and water regulations.

National Water Policy

The findings revealed:

- a. that there was no agreement on whether the National Water Policy addresses the following IWRM issues or not:
 - i. Equity
 - ii. Gender mainstreaming
 - iii. Climate change
 - iv. Food security
 - v. Investments to balance out supply and demand in terms of both space and time,
 - vi. The protection of people against extreme events (floods, droughts)

- b. that there was no agreement on whether the National Water Policy addresses the following IWRM issues excellently or not:
 - i. Water resource protection
 - ii. Priority use of water
 - iii. Rural water supply
 - iv. Urban water supply
 - v. Institutional strengthening
 - vi. Overall resource management, conservation and protection of water
 - vii. resources
 - viii. Water resources assessment
 - ix. Service delivery
 - x. Public investment

- c. that there was no agreement on whether the National Water Policy addresses the following IWRM issues moderately or not:
 - i. Capacity building and human resources development in water sector
 - ii. Environmental sustainability
 - iii. Efficient use of water
 - iv. Health and sanitation
 - v. The availability of funds and funding strategies for water supply and
 - a. sanitation,
 - vi. Private investment
 - vii. Research

4.4 Level of mainstreaming of IWRM considerations in the legal framework

The findings revealed that the legislative framework underwent reform with regard to IWRM within the last decade.

Key improvements of the legislative reform

- a. The findings revealed that the current water act 2002 pays attention to water resources management and provides for application of Dublin principles. In addition the separation of the policy and management in the water sector, and separation of water services and water issues were done, and also a new water act is in place and new water sector institutions are in place.
- b. There is also stakeholder involvement and the role of women in WRM (gender mainstreaming). New institutions have been created at the lowest water basin level.
- c. There is also management at catchment/basin level and emphasis on water use efficiency and participatory approach to planning/policy development. There is an increase in the level of funding.

4.5 Level of mainstreaming of IWRM considerations in the institutional framework and implementation/enforcement mechanisms

The Northern Water Services Board framework for implementing IWRM involves the following institutions:

- a. Water resources management authority
- b. Regional catchment boards
- c. Water users associations

The Ministry of Water and Irrigation Framework for Implementing IWRM involves the following institutions:

- a. National level- Ministry of , Water Resources
- b. Management Authority and Water Service Regulatory Board
- c. Regional level- Catchment Area Advisory Committees and Water service providers
- d. Local level- Water resources users associations and Water service providers
- e. A standing committee is to be constituted to implement IWRM plan.

The findings reveal that the Water Resources Management Authority framework for implementing IWRM involves the following institutions:

- a. Kenya Water Partnership- stakeholder forum
- b. Catchment Area Advisory Committees

- c. Water Resources Users Association

No response about the institutional framework for implementing IWRM was notcommunicated from the following institutions:

- a. Nairobi Water and Sewerage Company.
- b. United Nations Human Settlement Program
- c. National Irrigation Board
- d. Kenya Water Institute.
- e. Water Services Trust Fund.
- f. African Wildlife Foundation.
- g. GTZ –Water sector reform Programme
- h. Unicef Kenya

The following institutions implemented IWRM as follows:.

- a. Action Aid Kenya implemented water projects to alleviate poverty and built capacity of communities in water services provision
- b. The Water Services Regulatory Board for implementing IWRM involves the ministry of water and irrigation in policy and for regulatory purposes, there is the water resources management authority which has the regional WRMA office/Basin committees under it.
- c. The Christian Partners Development Agency worked with river basin committees commonly referred to as water committees

4.6 Challenges related to implementation of IWRM in the country

The main issues and challenges facing water resources planning and management were:

- a. deforestation,
- b. water scarcity
- c. corruption,
- d. pollution,
- e. lack of know how/lagging behind in technology,
- f. inadequate capacity (human and infrastructure),
- g. climate variability,
- h. low investment in storage and transport,
- i. growing population putting strain on scarce water, deterioration of existing water facilities,
- j. lack of consideration of operation and maintenance costs,
- k. lack of professional and skilled manpower,
- l. lack of maintenance tools,
- m. uneven distribution, poor income of the population, red tape,
- n. catchment conservation and protection,
- o. limited funding,
- p. lack of capacity of staff to deliver services,
- q. lack of proper institutional frameworks, overlapping roles of institutions lack of water and sanitation data in the country.

- r. Poor dilapidated water structures and systems.
- s. serious catchment degradation especially in water towers,
- t. inadequate knowledge base for surface and ground water resources,
- u. lack of water and sanitation data,
- v. lack of proper institutional frameworks, demand management,
- w. Unavailability of water resource distribution , water delivery systems ,

5 CASE STUDIES OF IWRM INITIATIVES IN THE COUNTRY

5.1 Case 1: Tana River Delta irrigation project (TARDA)

The Proposed Tana River Integrated Sugar Project for Mumias Sugar is to be located in Lamu District of coast province in Kenya. Information from an Environmental Impact Assessment project report submitted to the National Environment Management Authority (NEMA) indicates that once the project is implemented, it shall consider an integrated wetland management according to the requirements of the Ramsar convention on wetlands.

Ramsar define 'Wise use' of wetlands as 'the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development' A series of guidelines on implementing this concept have been produced and focus on three specific responsibilities of contracting parties.

- Adopt national wetland policies;

- Develop programmes of wetland inventory, monitoring, research, training, education and public awareness;

- Take action at wetland sites, involving the integrated management plans covering every aspect of the wetlands and their relationships with their catchments;

5.2 Case 2: Turkwel Hydroelectric Project

Turkwel Power Station is one of the major Hydro Electric Power Station in Kenya. It is situated North West of Kenya, at the border of Turkana and West Pokot and Pokot North districts approximately 550 km from Nairobi. The project was conceived as a multipurpose project to comprise of hydro power production, agriculture, fisheries and tourism development. The project was constructed under the control of KVDA from 1986 to 1991.

Turkwel Power Station has the capacity of 106MW. The power produced is connected to the national grid at Lessos sub station on a 220KV transmission line over a distance of 230 km. It generates approx. 10% of the national electricity supply.

Water is a key resource whose development, management and utilization underpin the socio-economic fabric of any nation. However, the capacity for water resources to meet multi-sectoral needs—agriculture, livestock development, domestic, industrial, hydropower generation, wildlife and recreational purposes—has been over-stressed by the increase in population, changing land use patterns, wastage, misuse, pollution and poverty in both urban and rural Kenya. Hence it is worth noting that the integrated approach of water use has been implemented in this project.

5.3 Case 3: Sondu Miriu Project

Sondu Miriu River is one of the six major rivers in the Lake Victoria basin, draining a total area of 3470 kilometre² in the Western part of Kenya. The river originates from the western slopes of the Mau Escarpment and flows through a narrow gorge, penetrating the Nyakach Escarpment. It then meanders into the Odino falls before entering the flood plains of Nyakwere where it drains into the Winam Gulf of Lake Victoria.

Sondu Miriu HEP Project is located about 400 kilometres from the capital city of Nairobi. It covers six sub locations with a population density of 500 people per square kilometre. The Kenya Generating Company, (KENGEN) plans to divert water from the Sondu–Miriu River into a regulating pond with a capacity of 1.1 million metre³. This water will then be led into the main power house via a 7.2 kilometre tunnel. The project is in its civil works stage involving construction of camp sites, roads, a bridge, communication implements and blasting of the tunnel which is still in the initial stages.

5.4 Lessons learnt from IWRM initiatives in Kenya

From the different case studies, it has been learnt that the concept of integrated water resource management is not new to the different upcoming and some already existing water projects in Kenya. Some projects such as the Turkwel Gorge hydro power project have already adopted the integrated water resource use. Other proposed projects such as the TARDA sugar project which has not yet been implemented attempts to adopt the integrated water resource management.

6 CONCLUSIONS AND RECOMMENDATION

6.1 Conclusions on the level of implementation of IWRM

Different stakeholders have adopted the implementation of the IWRM in the country. However, some of them are on the process of mainstreaming the concept in their water use management plans.

The survey conducted revealed that there is a link between the poverty levels in the country and the water resource use. It was also revealed that IWRM was recognized as an important tool for water resources planning development and management. It was revealed that the current water Act 2002 pays attention to water resources management and that different Kenyan institutions have considered the IWRM in their management differently in different dimensions

6.2 Recommendations for improving IWRM implementation

The issue of international waters arose at a conference organized by the Ministry of Environment and Natural Resources (Kenya) in collaboration with the World Bank, the World Bank Institute, the Government of Sweden and other stakeholders. This is an important regional water issue that needs further debate. The existing pre-independence treaties on the international waters, especially those related to Lake Victoria and River Nile, were singled out as hindrances to effective management and development of water resources in the region. There is therefore need to initiate dialogue and re-examine these treaties with a view of formulating common strategies for use, conservation and management of both the waters and the catchment basins from which they arise.

Conferences like this are important as means of sensitizing policy makers and leaders on the emerging challenges in water resource management. The workshop recommendations will assist in finalizing and enriching the main components of the Integrated Water Resources Management Strategy (IWRMS).

7 REFERENCES

NEMA project report on the proposed Tana Athi River Delta irrigation project for Mumias Sugar

National Environment Management Authority Project report for the proposed Sondu Miriu Project
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