

REPUBLIC OF RWANDA



MINISTRY OF NATURAL RESOURCES

WATER RESOURCES MANAGEMENT SUB-SECTOR STRATEGIC PLAN (2011 – 2015)

Ensuring that Rwanda's Waters are equitably harnessed and sustainably managed to satisfy its development needs and environmental commitments enshrined in the EDPRS targets and Vision 2020 aspirations, while fulfilling its international obligations

**Towards a Wealthy, Healthy and Green
Rwanda and Planet**

December, 2011

Foreword

Dear Stakeholders,

I'm pleased, on behalf of the Ministry of Natural Resources and indeed the Government of Rwanda, to present the Water Resources Management Strategy 2011-2015. This strategy primarily seeks to operationalise a National Water Resources Management Policy recently formulated by Government.

In 2000, the Government and people of Rwanda embarked on the road to transform the country from a poor low income country to a medium income country by 2020, and laid the targets in the document called the Vision 2020. As part of realising these targets, the Government has implemented medium term plans, the second being the Economic Development and Poverty reduction Strategy (EDPRS) 2007-2012. The EDPRS identified a number of activities, among which are large scale investments to ensure every Rwandan has access to clean water; at least half of the households are connected to electricity; irrigated agriculture is considerably expanded to meet the country's food security and employment; and, industrial and tourism development are facilitated. These developments will undoubtedly impose huge demands on the country's water resources. To meet this demand sustainably, Rwanda will restore the productivity of its watersheds, control pollution and promote efficient use. It will also have to strengthen the synergy among the different sectors dependent on water resources. We are already several steps in this direction. Rainwater harvesting is being piloted, a number of watershed rehabilitation projects are on-going, and we have adopted a Sector-wide Approach (SWAp).

We recognise that our waters are shared. But we contend that the increased use of our water resources for development will not present serious challenges. This strategy will help increase our internal capacities to manage any conflicts and participate actively in regional and international cooperation frameworks for trans-boundary and international waters. Rwanda's unique position as an upstream country in the Nile and Congo basins not only provides us opportunities to manage complex borderless issues like climate change, but also a launch pad to strengthen cooperation in other development areas.

We believe very strongly that, when implemented, this strategy will enhance stakeholder engagement - especially private sector participation - involvement; improve financing and coordinated planning, that remains a key challenge in WRM.

Finally, the implementation of this strategy requires the commitment of every stakeholder. We will count on the positive contribution of everyone from farmers in the various watersheds to climate change activists in Bonn and New York. Thankfully, this Strategy will put in place an appropriate framework for active stakeholder engagement.

Ambassador Stanislas KAMANZI
MINISTER OF NATURAL RESOURCES

Acronyms and Abbreviations

CDD	Community Driven Development
CDF	Common Development Fund
CEPGL	Economic Community of the Great Lakes Countries
CICOS	<i>Commission Internationale du Bassin Congo-Oubangui-Sangha</i> (International Commission for the Congo, Oubangui and Sangha River Basins)
CPAF	Common Performance Assessment Framework
CWS	Coffee Washing Stations
DDPs	District Development Plans
EAC	East African Community
EDPRS	Economic Development and Poverty Reduction Strategy
EIA	Environmental Impact Assessment
ENR	Environment and Natural Resources
EU	European Union
EWASA	Energy, Water and Sanitation Authority
FONERWA	Environment Fund of Rwanda (French acronym)
GoR	Government of Rwanda
GIZ	German Technical Cooperation
ICT	Information and Communication Technologies
ISAE	Institute of Agriculture and Livestock (Busogo)
ISAR	Institute of Agronomic Sciences of Rwanda (French acronym)
IWRM	Integrated Water Resources Management
KPIs	Key Performance Indicators
LVBC	Lake Victoria Basin Commission
MDGs	Millennium Development Goals
M&E	Monitoring and Evaluation
MINAGRI	Ministry of Agriculture and Animal Resources
MINIRENA	Ministry of Natural Resources
MININFRA	Ministry of Infrastructure
MINECOFIN	Ministry of Finance and Economic Planning
MTEF	Medium Term Expenditure Framework
NBI	Nile Basin Initiative
NELSAP	Nile Equatorial Lakes Subsidiary Action Programme
NISR	National Institute of Statistics of Rwanda
NUR	National University of Rwanda
OCIR Cafe	Rwanda Coffee Development Authority
PPP	Public-Private Partnership
PSTA II	Strategic Plan for the Transformation of Agriculture in Rwanda – Phase II
RARDA	Rwanda Animal Resources Development Agency
RADA	Rwanda Agricultural Development Agency
RBS	Rwanda Bureau of Standards
RDF	Rwanda Defence Forces
REMA	Rwanda Environment Management Authority
RNRA	Rwanda Natural Resources Authority
RURA	Rwanda Utilities Regulatory Authority
TWRM	Trans-boundary Water Resources Management
SIDA	Swedish International Development Cooperation Agency
SWAp	Sector-Wide Approaches
SWOT	Strengths, Weaknesses Opportunities and Threats
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WRM	Water Resources Management
WUCs	Water User Committees

Executive Summary

Background

Water is a strategic natural resource for Rwanda, underpinning the country's socioeconomic development and ecosystems sustenance. The beautiful green hills and moist valleys that produce food all year round and attract international tourists are sustained by water. Rwanda's water is also a strategic tool for Rwanda's geo-political cooperation and security. All of Rwanda's waters are shared, due to its upstream location in the Nile and Congo River Basins.

In the Vision 2020, the GoR has rolled out a comprehensive programme to transform Rwanda to a medium income country with a healthy and productive population. Strategic exploration and productive utilisation of water resources such as through hydropower production, supplying clean water to all Rwandans, expanding irrigated agriculture, and supporting industrialisation, will increase considerably.

The main Challenge – *meeting increasing multiple water demands, in the face of declining water quantity and quality, and inadequate governance framework.* In the next 5 years, Rwanda's main WRM challenge will be meeting the increasing multiple water demand for internal use and trans-boundary needs, with limited capacity and in the face of declining water availability due to ecosystems degradation, pollution and climate change. The country's water resources management (WRM) capacity is limited in terms of human resources, institutional systems, and infrastructure. Rwanda's water resources are severely degraded – primarily due to land degradation resulting in siltation of water bodies; pollution from point and non point sources, including agricultural chemicals, inappropriate human settlements and poor urban and industrial waste management. Because of increasing population pressure and declining water quality and quantity, access to clean water is a problem. Coordinated internal use and enhancing trans-boundary water cooperation are some of the critical and immediate priorities for the GoR.

Rationale for a new, IWRM-focused strategy

- a. A new Water Policy, 2010 has been formulated, with a clear objective of ensuring that Rwanda's water resources are managed in an integrated and sustainable way, using an Integrated Water Resources Management (IWRM) approach. IWRM is a high level target for the EDPRS being monitored in the Common Performance Assessment Framework (CPAF). The WRM Policy has three main objectives: 1) to protect, conserve, manage and develop Rwanda's water resources in an integrated and sustainable manner; 2) to ensure that water resources are available in adequate quantity and quality for socio-economic and ecological needs of the present and future generations; and 3) to ensure that decisions affecting water resources management are made in a coordinated manner and with the participation of all stakeholders at local, national and trans-boundary levels.

This strategy has been designed to translate the above policy objectives into desired results. It provides a framework for participatory water resources governance, in which all stakeholders, including private sector, civil society and local user communities, will play an active role.

Major issues in Rwanda's water availability and demand balance

Precipitation is the main source of water for production but it's unevenly distribution in time and space, with about half of precipitation occurring in one quarter of the year. The western half of the country receives an average of 1400 mm, while the eastern half receives less than 1000 mm. This constrains production and challenges resource managers to adopt innovative approaches to manage the water resources equitably and sustainably.

Water use efficiency is very low – about 4.3 km³ of rainfall is lost as runoff water every year; and between 30-40% of water is lost in inefficient supply systems. Most irrigation systems are inefficient.

Rwanda uses less than 2% of its available fresh water resources hence, there is scope for increased use of the resource in the economic and social transformation. However, the planned developments in energy, agriculture, infrastructure, industry and domestic supply, indicate that water demand will increase in the next 5 – 10 years.

Nonetheless, *Rwanda remains a water-scarce country. Its per capita fresh water availability of less than 1000 m³ is about a quarter of Africa's average of 4,000 m³.* This is a wake-up call for Rwanda to step-up its investments in efficient, productive, equitable and sustainable management of its water resources.

Rwanda has made progress in innovative water resources management – rehabilitation of watersheds and major catchments; rainwater harvesting and storm water management; climate change mitigation through catchment afforestation and energy efficiency, among others, have been undertaken, with impressive results. For instance, Lake Cyohoha North in Bugesera, which had shown signs of disappearing, has been restored when its recharging wetlands were protected; Rugezi wetland complex – the main source of water for Lakes Burera and Ruhondo, was restored, resulting in improved hydropower production after the 2004 power crisis.

These innovations, however, remain too small and disjointed. Rwanda must scale up these demonstrations throughout the country, consolidate and share the outcomes as lessons for especially downstream countries.

Strategic actions to be undertaken

This strategy will realise 6 strategic outcomes and 39 outputs, to reach the policy objectives. The main results areas are:

- ✓ *An effective framework for water resources governance:* The key outputs under this outcome will include: an institutional structure for WRM; a Water Resources and Development Master Plan; water catchment and sub-catchment management plans and structures; harmonised water-related sector policies and plans; public-private partnership strategies for WRM; sustainable financing modalities for WRM; communication strategy and framework for active stakeholder participation.
- ✓ *Cost-effective water resources assessment and monitoring system in place and operational:* at least 5 outputs will be realised under this outcome i.e.: updated hydrological database and water resources information system; water quantity and quality status reports regularly published; water quality standards established, communicated and enforced; strategy for assessment, exploitation and monitoring of geothermal resources developed; and a mechanism for effective control of point and non-point source pollution in/along water resources;
- ✓ *Critical watersheds and catchments are rehabilitated and basic ecological functions restored:* To realise this outcome, critical watersheds, catchments and sub-catchments will be mapped and their ecological functioning analysed; micro-catchment and catchment level management rehabilitation plans developed and implemented; wetlands will be technically and economically valued; and a national programme for their conservation and management implemented; and invasive species in aquatic ecosystems will be controlled and monitored.
- ✓ *Efficient and equitable water allocation and utilisation framework:* Under this outcome, Sectoral plans for water demand and utilisation will be formulated and implemented; Catchment-based Water Allocation Master plan reflecting rights and obligations of water users developed and implemented; a comprehensive strategy for promoting water use efficiency, will be developed. A key target in water conservation and efficient use will be to ensure that all institutions and at least 50% of households have rainwater harvesting facilities;
- ✓ *An effective framework for water-related disaster management, climate change mitigation and adaptation in place and implemented;* Changes in water availability, quality and water-related disasters (drought, floods, epidemics, destructive rains, etc) are some of the key indicators of climate change. Five strategic outputs will be achieved, all relating to planning, capacity building and information generation and preparedness.
- ✓ *Basic Capacities installed and effective framework for sustained WRM capacity development and knowledge management developed:* Under this outcome, climate change resilience and vulnerability status will be established and regularly updated; early warning systems on extreme weather conditions; National Water Balance and Water Security Plan in place and implemented; operational safety plans for water ways and water infrastructure installations; and effective National Disaster Management Plan that reflects and prioritises water-related disasters in place and implemented.
- ✓ Knowledge management is a special priority for Rwanda, considering that rational decisions cannot be made without reliable information and capacity to utilise the knowledge appropriately. Support to research, documentation and information exchange will be key outputs. Improving the hydrological infrastructure network to ensure that reliable water data is regularly collected and analysed, is another key output.

- ✓ *Effective framework for managing shared waters:* A framework for transboundary water cooperation will be established. Rwanda will have capacity to actively engage other riparian countries to ensure that water resources are utilised in a balanced and harmonious way.

Financing and Implementation modalities

A total of US \$ 64.5 million will be required to implement the strategic plan. About 47% of this will be spent in the first 2 years, where urgent strategic investments in the hard and soft aspects of WRM capacity development will be made. The Table E1 presents the budget summary and allocations by Outcome.

Table E1: Budget summary and allocation by outcome

	Outcome	Total Budget (US \$)
1	Effective Water Governance framework that reflects the principles of IWRM	7,578,550
2	Cost-effective Water Resources Assessment and Monitoring System	4,967,000
3	Watersheds and catchments rehabilitated and their basic ecological functions restored	17,472,500
4	Efficient and Equitable Water Allocation and Utilisation framework	8,678,750
5	An effective framework for Water-related disaster management and Climate change mitigation and adaptation.	17,644,000
6	Effective framework for management of shared waters	2,657,750
7	Effective framework for WRM Capacity Development and Knowledge Management	5,503,500
	Total Budget for the Strategic Plan	64,502,050

As noted from Table E1, the budget allocations to outcomes 3 and 5 are about twice to thrice that of other results areas/ outcomes. This signifies the priority that this strategy has put to enhance the productive side of water resources i.e. rehabilitating the ecosystems and strengthening the national resilience to manage the expected water availability challenges. Outcomes 1 and 7 also focus on institutional capacity development for improved and sustainable management of water resources.

Where will the financing come from?

While raising the financial resources is an acknowledged challenge, addressing the supply-side of water resources is important for all stakeholders. The GoR has expressed commitment to prioritise WRM, and some US\$ 11.6million (about 18% of the budget) is potentially available through the medium term expenditure framework (MTEF) commitment. Secondly, a number of development partners, notably Dutch Embassy in Rwanda, SIDA, USAID, the European Union, UNICEF, UNDP, the African Development Bank (AfDB), World Bank, and Japan International Cooperation Agency (JICA), International Fund for Agricultural Development (IFAD), the Food and Agricultural Organisation of the UN (FAO), and the German Development Cooperation (GIZ), among others, have expressed interest in supporting Rwanda’s WRM programmes, in more ways than one. They are supporting large scale water-related infrastructure programmes, ecosystems rehabilitation, institutional capacity development, and trans-boundary water cooperation. They have made commitments in the country cooperation strategies (CSP) to support activities related to sustainable WRM. Some, like SIDA, have already expressed commitments to support the WRM

interventions, besides supporting the trans-boundary environmental programmes in which WRM are key components. This strategic planning process has been supported by GIZ under its Nile Basin Trans-boundary Water Cooperation Programme. The GoR will leverage resources from these and proactively engage other partners, to realise the resources needed.

It is important to appreciate that the urgency to operationalise this strategy is, in part, a result of the on-going programmes in other sectors, which need strategic guidance. Any delays in installing a strong IWRM framework will have far reaching repercussions on the delivery and sustainability of outcomes in other sectors that are hinged on sustainable WRM.

Conclusions and immediate actions

Although this strategy has come at the tail end of the EDPRS, its elaboration is timely, as it incorporates lessons from the EDPRS implementation to establish a more solid IWRM programme for Rwanda. The various EDPRS-linked investments have revealed the challenges that Rwanda faces and the needs for future management of water resources. A coordinated mechanism to manage water demand and regulate the use of water resources among competing demands, was emphasised by most stakeholders. This IWRM strategy will provide the impetus to realise the MDG targets for 2015, GoR's 2017 targets and the Vision 2020 aspirations.

The priority actions that must be undertaken as a logical first step are:

- Review the priorities in light of the current political directions and on-going activities at ministerial and cross-sectoral level;
- Formulate an action plan for year 1, with quarterly and six-monthly outputs aligned with the EDPRS sub-sector targets and existing budget;
- Elaboration of the Water resources Development and management master plan, since this has implications for the delivery of planned and on-going investments in irrigation, hydropower, tourism, industrialisation and water supply master plans;
- Review the water governance framework, with a view to putting in place a new institutional structure. This is a basis for capacity development in the WRM sub-sector;
- Mobilise technical assistance to establish the coordination mechanism, provide technical guidance to WRM staff and policy back-stopping to MINIRENA leadership, in getting the Strategy off the ground.
- Develop a resource mobilisation strategy (in consultation with MINECOFIN), map and start dialogue with potential financing partners.

Contents

Foreword.....	2
Acronyms and Abbreviations.....	3
Executive Summary	4
1. INTRODUCTION.....	11
1.1 General Background	11
1.2 Overview of the Country Profile	12
1.3 Rationale for a New Water Resources Management Strategy.....	13
1.4 Structure of the IWRM Strategic Plan	14
2. SITUATION ANALYSIS OF WATER RESOURCES SUB-SECTOR.....	15
2.1 The Supply Side: Water Resources Availability	15
2.1.1 Precipitation and spatio-temporal distribution of water resources	15
2.1.2 Surface water bodies	17
2.1.3 Ground water aquifers	17
2.1.4 Wetlands.....	18
2.2 Status, Trends and Key Issues in Water Resources Demand and Utilisation.....	19
2.2.1 General	19
2.2.2 Water for domestic and municipal use	19
2.2.3 Water for agricultural production	21
2.2.4 Water for livestock development	23
2.2.5 Fisheries and aquaculture development.....	23
2.2. 6 Water for industrial development.....	24
2.2.7 Water for energy development.....	25
2.2.8 Water for infrastructure development	25
2.2.9 Water for transport.....	26
2.2.10 Water for tourism and recreation services	26
2.2.11 Water for ecosystems maintenance	26
2.3 Transboundary issues and implications for internal water utilisation.....	27
2.4 Summary of the main Drivers for water demand and supply in Rwanda.....	28
2.5 Water Resources Development and Management: Sub-sector Performance Review.....	29
2.5.1 WRM Sub-sector priorities, investment plans and financial performance	29
2.5.2 WRM investments in other sectors	30
2.5.3 Achievements in watershed protection and water resources management.....	31
2.5.4 Pollution control and water quality monitoring	32
2.5.5 Water hyacinth control	33
2.5.6 Water governance framework – coordination and monitoring	33
2.6 Stakeholder Analysis Summary.....	35

2.7 Summary of the Water Sub-sector SWOT	36
2.8 Key challenges to effective water resources management in Rwanda.....	37
3. GOVERNMENT OF RWANDA’S STRATEGIC VISION AND IMPLICATIONS FOR IWRM.....	39
3.1 National Development Vision and Strategic framework.....	39
3.2 International framework for IWRM.....	40
3.3 Future outlook: Implications for Rwanda’s IWRM Regime	42
4. THE STRATEGY – PRIORITIES, PROGRAMMES AND ACTIONS.....	43
4.1 Sub-sector Mission and Objectives.....	43
4.2 Key Priorities for the Water Resources Sector as expressed in Policy Statements.....	43
4.3 Strategic Actions and Specific Activities for 2011-2015.....	46
5. IMPLEMENTATION ARRANGEMENTS	49
5.1 Institutional Roles and Responsibilities	49
5.1.1 Policy ministries and agencies	49
5.1.2 Regulatory institutions	50
5.1.3 Decentralised structures	51
5.1.4 Research and training Institutions.....	51
5.1.5 Non-state actors	52
5.2 Formulating action plans, projects and budgets.....	52
5.3 Sector-wide coordination mechanisms.....	53
5.4 Cost implications	53
6 FINANCING AND FINANCIAL MANAGEMENT STRATEGY.....	54
6.1 Financing Arrangements	54
6.2 Sector Budget Support and Joint Financing	55
7. MONITORING, EVALUATION AND LEARNING.....	56
7.1. Framework for IWRM Monitoring and Evaluation	56
7.2 Indicators, data collection and reporting	56
7.3 Key considerations for the IWRM M&E framework.....	57
7.4 Knowledge management and communication strategy.....	59
8. ASSUMPTIONS, RISKS AND RISK MANAGEMENT	61
8.1 Key Assumptions.....	61
8.2 Possible risks to the implementation and realization of target results	61
8.3 Risk Management	61
ANNEXES.....	62
Annex I: Logical Framework for the Rwanda Water Resources Management Strategy (2011-2015)	63
Annex 2: Time frame for the Implementation of the IWRM Strategic Plan 2011/12 – 2015/16.....	70
Annex 3: Budget by Output/ Major Activity and Outcome	76
References.....	78

1. INTRODUCTION

“Countries that depend on hydro-electric energy, geothermal electricity or even methane gas – as we propose to do here in Rwanda - must put appropriate water management policies in place, as Africa is one of the World’s driest continents” H.E President Paul Kagame¹ .

1.1 General Background

Water is a strategic natural resource for any country’s economic, social and cultural development. It is an important geo-political tool especially when waters are shared or are available so abundantly as to make a country powerful through production of food, energy, transport and other needed services. It is an indispensable resource for sustaining human, animal and plant life.

For Rwanda, water is probably the most important natural endowment, a basis on which nearly all most economic and social activities are anchored. Rwanda’s water comes naturally and is almost entirely used naturally. Over the last 3 decades, however, the water resources have been severely degraded, as evidenced by heavy sediments in rivers; pollution from agricultural chemicals and fertilisers, industrial effluents and municipal waste; reduced water levels and flow volumes, resulting in shortages. The water resources management (WRM) regime did not reflect the important position of water in sustaining lives, livelihoods and economy of Rwanda.

Box 1: Understanding the multiple uses of water...

- a) **Water for Basic human needs and poverty reduction.** Water is of fundamental importance to food production, for drinking, for sanitation and hygiene. Adequate quality water underpins health and basic quality of life.
- b) **Water for social and economic development:** Demand for water in social development includes education and health care. Without clean water and sanitation, schooling is curtailed as hygiene deteriorates. In economic development, water is central to energy generation and industrial development. Emerging non-food crops like bio-fuels will increase the demand for water.
- c) **Water for ecosystems sustenance** – natural ecosystems are fundamental to human well-being and development. Water is central to habitats’ sustainability. Increasing water crises contributes immensely to biodiversity loss;
- d) **Water Security** – floods, droughts, pollution spills onto water systems, etc., are of growing concern as agricultural, industrial, settlement and infrastructural development activities intensify. In many areas, increase in frequency and intensity of floods, droughts and accidents related to water. More people are living in zones prone to water-related disasters, such as wetlands, steep hills and congested slums. Resource scarcity is already fuelling human conflicts.

UN Water: Status Report on Integrated Water Resources Management and Water Efficiency Plans. 2008.

¹ Speech by H.E Paul Kagame at the Opening of the African Ministers of Finance and Environment in Kigali May 21, 2009.

This is a first comprehensive strategy for WRM in Rwanda. The need for a new WRM strategy has arisen out of the Government of Rwanda (GoR)'s plan to increase water use as a strategic factor of production; declining quantity and quality of the water resource base; and the need to regulate, monitor and ensure equity, efficiency and sustainability in water allocation. This strategy presents the medium-term plan for managing the country's water resources to meet the multiple needs and downstream trans-boundary obligations. It is timely, considering the changing policy and institutional context. The country is mid-way to the Vision 2020, and the EDPRS is past mid-term stage; a new 7-Year Government Plan has been elaborated to operationalise the priorities for the Presidential term 2010-2017; and Rwanda is consolidating its regional integration agenda, especially in the East African Community (EAC) and Nile Basin Initiative (NBI) where transboundary WRM are a critical issue. Equally important, Rwanda and other Nile basin countries, face significant climate change threats. Efficient water management is integral to the mitigation and adaptation strategy of the riparian countries.

The Preparation of this Strategy has been supported by the German Development Cooperation (GIZ) through its Trans-boundary Water Cooperation with Nile Basin Initiative (NBI).

1.2 Overview of the Country Profile

Biophysical characteristics: Rwanda is a mountainous country located in the heart of East and Central African Highlands. The country occupies a total surface area of 26,338 km². It shares boundaries with the Democratic Republic of Congo (DRC) in the West; Uganda to the North; Tanzania to the East and Burundi to the South. A rugged terrain that decreases gradually in elevation from the North-West to the South East is a key characteristic of the country. Topography varies from 900 meters above mean sea level in the East to 4,507 metres at the Karisimbi peak in the North. More than 40% of the area is located at elevations of between 1,500-1,800 mm. Rainfall averages 1400 mm but variation is high from about 2000 mm in the north-western to around 700 mm in South Eastern plains. With 2 rainy seasons i.e. March to May and September to December, and temperature ranging from 16° - 23°C, Rwanda enjoys a tropical temperate climate.

Population and demography: In 2009, the population was projected to be 10.1 million, 53% of whom were female (PRB, 2009; NISR, 2009; GoR, 2009²). Average population growth is 2.6% per annum, and although this represents a decline from 3% in 2006, fertility rates are still high (averaging 5.5 children per woman). With an average population density of 534 people per sq Km, Rwanda is the most densely populated country in Africa. The population is generally young – about 67% of the population is under 25 years. In terms of socio-economic wellbeing, 83% of Rwandans are rural, with only 17% of the people categorized as urban. But the urban population is increasing fast, and it is estimated that by 2020, it will be 30%. Women make up 70% of the rural and 65% of the illiterate population (MINAGRI, 2009).

² Rwanda State of the Environment and Outlook 2009.

Poverty and social wellbeing: Rwanda was ranked at 167th out of 182 on the Human Development Index (UNDP, 2007). Some 56.4% of the population lives under the US \$ 1 poverty line (NISR 2007). Life expectancy at birth was 49.7 for male and 51.4 for females, with 64.9% of adults aged 15 and over categorized as literate. Poor people are likely to be women, disabled, widowed, rural or agricultural workers. The majority (90%) of the population are engaged in subsistence agriculture (81% men; 93% women), where landholdings are very small.

Economy: Rwanda's total gross domestic production (GDP) stood at Rwf 2,992 billion (or approx \$ 5.27 billion) in 2009, a threefold increase from US\$ 1.8 billion in 2000. Per capital GDP is estimated at US\$ 520 (MINECOFIN, 2010). Over the last 10 years, economic performance has been impressive, with real GDP growing at more than 10% annually during 1996-2000, 6.4% during 2001-2006 and 6% in 2009. Nonetheless, the country still faces a challenge of high poverty levels. The GoR recognises this challenge, and has designed mechanisms to fast-track poverty reduction and ensure equitable growth by 2020. Investing in access to clean water, increasing production in rural sectors, and ensuring environmentally sustainable growth, are critical tenets of the GoR's development agenda. Rwanda's economy is dependent on natural resources but the declining natural capital base has driven the country towards services-centred growth. Rwanda is adopting a low carbon growth path that aims to deliver pollution-free and resource-efficient development.

1.3 Rationale for a New Water Resources Management Strategy

The GoR realises that a clear and comprehensive strategy for managing its water resources is needed now more than at any time in history for a number of reasons.

Water is pivotal to Rwanda's development: it comes naturally and, for the most part, is used naturally with little value addition.... In all parts of Rwanda, water availability makes a difference regarding who is healthy, wealthy or food secure. But its value as an economic good is often not appreciated, and neither is the possibility of its exhaustion imagined by many. As a result, water use is inefficient.

Water demand is increasing yet the water stocks are not clearly known or monitored. The new development dispensation (EDPRS and sector targets) has created unprecedented demand for water with implications for equitable and sustainable WRM. The main water users are agriculture, domestic and industry. Detailed analysis of water demand by sector is discussed in section 2.2.

Water resources are being depleted, and the quantities and quality are declining at unprecedented levels. Over the last three decades, critical watersheds and water catchments have been converted into agricultural lands, resulting in destruction and drying up of many streams, and decline of ground water reserves. Watershed destruction, inappropriate settlements, inappropriate agricultural practices, and inadequate sanitation have resulted in increased siltation and

sedimentation, increased pollution and increased risk of invasive aquatic weeds. Recent incidences of prolonged drought in the Eastern Province have been linked to changing climate conditions.

Water in Rwanda is not only a strategic resource; it's now a major source of natural and human-induced disasters. Rwanda has become more susceptible to frequent and destructive water-related disasters i.e. landslides, floods, erratic rains, prolonged droughts, strong winds and water currents that cause marine accidents, disease epidemics such as cholera, etc. Water is regarded as the main destroyer of infrastructure (roads, bridges) in Rwanda, with more than 40% of sector budget reportedly spent on repairing or rehabilitating water-destroyed infrastructures (Transport Policy, 2008). These have significant impacts on the economy and livelihoods.

Transboundary WRM concerns are increasing: All of Rwanda's waters are trans-boundary, 90% belonging to the Nile Basin and the remaining 10% to the Congo Basin. Increased water stress in most parts of the basin has raised concerns for sustained availability.

Yet the country lacks the basic tenets of water governance – to effectively manage multiple water interests; ensure equity and effective stakeholder participation; balance national and trans-boundary interests; secure sustainable financing. Rwanda is still struggling to rebuild the infrastructure and human fabric destroyed by the 1994 genocide. For instance, Meteorological Services – the principle source of climatic data - had only 15 weather stations functioning in 2008 out of more than 150 that existed prior to the genocide (Mutabazi, 2008).

The GoR has realised the urgent need to reverse the deteriorating situation of water resources, and put in place a framework to manage them sustainably. To this end, a new policy for WRM has been drafted, adopting the IWRM approach. This strategy is designed to operationalise the IWRM and achieve the policy objectives.

1.4 Structure of the IWRM Strategic Plan

This strategy is wide in scope. It departs from traditional sectoral or ministerial perspective and embraces holistic and integrated approach to WRM. The strategic planning process involved extensive stakeholder consultations, and analysis of international good practices in IWRM.

The strategy document is organised in 8 chapters. Chapter 1 outlines the overall context and purpose of the strategy; chapter 2 presents the situation analysis of the WRM sub-sector. In chapters 3 and 4, the GoR's strategic development Vision and the IWRM programmes are discussed, while chapters 5, 6 and 7 present the implementation framework, financing modalities and Monitoring and Evaluation. Chapter 8 concludes with Assumptions and Risks. The detailed programme log-frame and Budget are presented in Annexes 1 and 2 respectively.

2. SITUATION ANALYSIS OF WATER RESOURCES SUB-SECTOR

This section discusses the status and trends in the availability, utilisation and management of Rwanda's water resources. In developing an IWRM strategy, it must be understood that WHAT water is used for, HOW and WHEN it's used, depend as much on its availability and mode of occurrence, as on the socioeconomic needs of the population or the priorities of Government.

2.1 The Supply Side: Water Resources Availability

Rwanda is endowed with a dense hydrological network comprising of numerous small rivers, streams and wetlands that drain into lakes and other reservoirs. It has an estimated 9.5 billion m³ per annum of actual total renewable water and a per capita availability of close to 1,000 m³ (UNEP, 2010). Table 1 presents the status of water availability in 2008.

Table 1: Water Availability in Rwanda (2008)

	Water availability Parameter	Unit	Amount
1	Average precipitation in depth	(mm/yr)	1,212
2	Total Renewable Surface water	(billion m ³ /yr)	9.5
3	Total Renewable Ground Water	(billion m ³ /yr)	7
4	Total renewable water	(billion m ³ / yr)	9.5
5	Per Capita renewable water (actual)	(m ³ / yr)	977.3
6	Per Capita renewable water (Africa)	(m ³ / yr)	4,008

Source: UNEP (2010): Africa Water Atlas

As indicated in Table 1, per capita water availability is about a quarter of Africa's average. Hence, Rwanda is among the least water-endowed African countries. A primary issue of IWRM strategic planning is to understand where and in what form water is. Rwanda's water occurs in principally 4 forms, viz: rainfall (precipitation); surface water bodies; ground water aquifers; and wetlands.

2.1.1 Precipitation and spatio-temporal distribution of water resources

Rwanda receives an average annual precipitation of 1200 mm. Rainfall ranges from as low as 700 mm in the Eastern Province to about 2000 mm in the high altitude north and west. Precipitation is the main form in which Rwanda's ground water aquifers and surface water bodies are recharged. Precipitation is the main source of water for agriculture, as more than 90% of Rwanda's agriculture is rain-fed. It is so important to Rwanda's food security and economic development that the GDP decline in 2003-04 was linked to major droughts which caused crop failure.

The fact that precipitation is unevenly distributed in time and space influences its water availability and utilisation in different seasons and regions.

As indicated in Table 2, about half of the total rainfall occurs in one season i.e. the March-May season. This natural flow of rainwater would dictate that half of the water-requiring activities (essentially farming) be done during this period, or that water is stored for use in time of shortage.

Table 2: Temporal distribution of precipitation

Period	Season description	Share of Total Annual Precipitation
Feb – May	Long rains (April is the wettest month)	48%
June – Mid-Sept.	Long dry spell.	Very little rains (25-50 mm especially in High altitude areas)
Mid-Sept – Dec.	Short rains (November the wettest during this season)	30%
Dec. – Jan.	Short rains with short dry spell	22%

Data source: UNEP (2009); Haguma et al (2008):

Besides temporal variations, rainfall in Rwanda exhibits wide geographical disparities. Virtually all of Rwanda’s water towers are located in the Albertine region – Nyungwe Mountain forest, Volcanoes National Park and the Rugezi wetland. However, the dense drainage network is relatively even allowing most parts of the country to receive water, albeit in different forms.

Table 3 shows that higher altitude zones receive higher rainfall and have better moisture retention conditions than the low altitude Plains which tend to have semi-arid conditions.

Table 3: Precipitation and Influencing factors for rainwater moisture retention by Altitude zone

Parameters	High Altitude zone (1800 – 3000 m)	Medium Altitude (central plateau) zone (1500–1800 m)	Low Altitude (Eastern plateau) (1250–1400 m)
Rainfall (mm)	1,300 – 2,000	1200 – 1,400	600 – 1,400
Temperature (oC)	16-17	18-21	20-24
Evapo-transpiration (mm)	1,000 – 1,300	1,300 – 1400	1,400 – 1,700
Relative Humidity (%)	80-95	70-80	50-70

Source: UNEP (2009). Rwanda: From Post-conflict to Environmentally Sustainable Development

From table 3, it can be observed that the high altitude North-West to South-West stretch of the country receives the largest share of annual precipitation, while the medium to low altitude North-East to South- East receives the least.

Understanding these spatio-temporal precipitation patterns is important in WRM, from a number of perspectives. Rwanda’s population density and socioeconomic activities are strongly correlated to rainfall. The most rainfall-endowed areas are also the most densely populated (except Kigali city). The types of agriculture practiced differ considerably across regions and tends to follow rainfall patterns. Rainwater management is very low in all regions. Most precipitation is lost through storm water runoff and evaporation. MINAGRI (2010) estimated that as much as 4.3 km³ is lost through evaporation annually. Rainfall is increasingly erratic and unpredictable, indicating that farming can no longer rely on precipitation alone. Rainwater must be properly managed if it is to support sustainable production. The spatio-temporal disparities and increasing unreliability of rainfall underscore the need for efficient and equitable WRM. In particular, harvesting and conserving rainwater; storage and internal redistribution; reducing losses through good soil and water conservation practices like mulching; adopting efficient irrigation technologies; and shifting to water-efficient crops, will be important adaptation measures.

2.1.2 Surface water bodies

Surface water bodies in Rwanda occupy a total of 135,000 Ha or 8% of the country's surface area (RADA, 2005). These include 101 lakes (1,495 km²), 861 rivers totalling 6,462 Km (REMA, 2010) and a network of disconnected wetlands. At least 3 of the largest lakes are shared - Lake Kivu (shared with DRC), Lake Cyohoha south and Lake Rweru (shared with Burundi). The in-land lakes are sustained by inflows from the dense network of rivers, streams and wetlands.

Table 4: Major river systems and corresponding basin extent

	River system	Surface Area (km ²)	Average Rainfall (mm)	Location
1	Nyabarongo Upstream	2,700	1,500	Northern highlands
2	Nyabarongo Downstream	4,450	1,200	Central plateau and south-Eastern plains
3	Rusizi	650	1,300	South- Western parts draining into L. Kivu
4	Sebeya	300	1,400	North-western parts draining into L. Kivu
5	Mukungwa	1,500	1,300	Northern parts
6	Akanyaru Upstream	2,650	1,200	
7	Kagera Upstream	5,000	900	
8	Akagera Downstream	4,550	800	
9	Muvumba	1,450	1,000	North Eastern part; drains into Akagera river and the Akagera Protected Area lakes
10	Mulindi	200	1,100	Northern Province

Source: UNEP (2009): Rwanda: From Post-conflict to Environmentally Sustainable Development

These river systems have been affected by extensive agriculture and human settlements, as evidenced by heavy siltation and sedimentation in nearly all rivers.

2.1.3 Ground water aquifers

Ground water accounts for 86% of safe drinking water supply for rural areas (MINITERE/SHER, 2005). In the Eastern and parts of the Southern Province, most people depend on boreholes. Ground water resources in Rwanda are estimated to discharge about 66 m³/second and about 22,000 sources have been recognised (Kabalisa 2006 in REMA, 2010). Extensive borehole drilling and shallow well construction have mostly been done in the eastern province since 1994. As of 2009, there were at least 400 boreholes and wells in various parts of the country. Although ground water is deemed safer than surface water, increasing pollution from agro-inputs (through leaching and erosion), and declining ability of ecosystems to naturally purify water, raise quality concerns.

There are a number of issues with strategic ground WRM implications: First, the nature, physical and geo-chemical characteristics, discharge capacities of the aquifers and main recharge areas, need to be established. Secondly, the functionality of existing infrastructure and quality of water delivered are not well known (MININFRA, 2010). Third, unregulated water abstraction in the face of limited flow/recharge rates and quality is an issue of concern. Without reliable data on ground water potentials, efforts to regulate its use will remain limited. Regulatory mechanisms that have

worked elsewhere – e.g. user fees and licenses, penalties to water polluters, managing climate-change related shocks, require reliable data and robust institutional systems.

2.1.4 Wetlands

Wetlands are among the most productive aquatic ecosystems in Rwanda, performing valuable ecological, social and economic functions. They serve as reservoirs and purifiers of fresh water. They attenuate peak flows, storing water and releasing it back gradually and allowing for year-round stream flow. They act as flood buffers and sink for sediments (including clay soluble inorganic nutrients); regulate climate; and contain large deposits of peat valued for its energy potential. Most importantly, wetlands help to maintain the quality of surface and ground water and regulate micro-climatic conditions through moisture recirculation, and cooling of surrounding areas. In extreme drought conditions, wetlands have supported food security, and large tracts of wetlands are under flood plain production of cereals, vegetables and other crops. Wetlands provide unique habitats to biodiversity especially for rare or threatened species, and are the only remaining biodiversity hotspots outside the three national parks and protected natural forests. They act as spawning and feeding grounds for fish, and support artisanal fisheries. They have become an important source of raw materials for the fast growing *Agaseke* (basket) sub-sector.

Rwanda has a total of 860 wetlands covering a total area of 165,000 Ha i.e. 7% of the total surface area (REMA, 2010). Major wetlands, their location and spatial extent are summarised in Table 5.

Table 5: Wetlands of significant importance in Rwanda

Wetland	Area (Ha)	Location	Economic and ecological features
Nyabarongo complex	24,698	Central plateau to southern plains	Agricultural activities along its vast watershed; Medium size HEP sites
Rugezi	6,294	Northern parts, draining into Lakes Burera and Ruhondo	Recharges Burera and Ruhondo lakes downstream, which are points of HEP generation; Large agric. Watershed with well-moderated micro-climate; Threatened habitat for rare fauna and flora species
Akanyaru	12,546	Southern border areas with Burundi	Support agriculture, artisanal fishing and have potential for transport;
Kagera	12,227	Southern plains along the border with Tanzania in the east	Hydropower; agriculture; navigation; tourism

Source: REMA (2010). IMCE Project Report, 2010.

These resources, however, face enormous pressures from agriculture, human settlements and urbanisation. Sediment load and biochemical pollution is an indicator of the declining capacity of wetland ecosystems to regulate water flow and filter physical and chemical pollutants. Indeed, recent inventories have reported that only 41% of wetlands remain in natural conditions, as most wetlands have been transformed into permanent agricultural fields (UNEP, 2009; REMA, 2010). Rwanda's main challenge in this regard, relates to establishing a balance between protecting wetlands to sustain the socioeconomic and ecological benefits, and continuing reclamation for

agriculture. Efforts have been made to delineate and protect critical wetlands, but the complexity and inter-connected nature of wetland systems require holistic intervention.

2.2 Status, Trends and Key Issues in Water Resources Demand and Utilisation

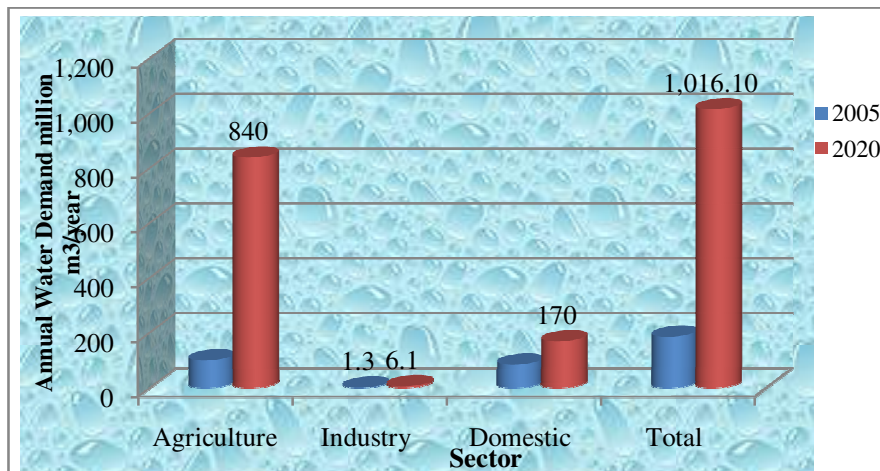
2.2.1 General

Demand for water in Rwanda primarily comes from the following users:

- Domestic use/human consumption (drinking, cleaning and personal hygiene);
- Agriculture and livestock (rain-fed and irrigated agriculture, livestock development);
- Fisheries development (both capture fisheries and aquaculture development)
- Industrial development;
- Energy development (hydro-power and geothermal);
- Infrastructure development (including road and housing construction);
- Recreation and ecosystem maintenance

However, the main users of water are agriculture, municipal and domestic use and industry. The annual water demand for 2005 and projections for 2020 is summarised in Figure 3.

Figure 3: Water withdrawals by sector for 2005 and 2020.



Source:

The trends in Figure 3 suggest that over the next decade, Rwanda’s water demand will increase by up to 10 times. Up to 80% of the increased demand will come from agriculture.

2.2.2 Water for domestic and municipal use

Domestic and municipal water use is taken to include clean water supply to households and institutions (schools, health facilities, prisons, public offices) for drinking, cooking, hygiene and other purposes.

The GoR recognises that access to adequate clean water and sanitation is a key strategy for reducing poverty. Water is particularly vital to the realisation of Rwanda’s health sector goals

given that more than 85% of health ailments are water-related (MININFRA, 2010). Inadequate sanitation is one of the main causes of water pollution.

Under the EDPRS, substantial investments have been made to raise access to clean water to 86% and basic sanitation to 80% by 2012. These efforts are already paying dividends. Access to clean water had reached 74% in 2008 (MININFRA, 2010), and Rwanda is among the nine African countries that are on course to reach the MDG target for clean water (UNEP, 2010). But nearly half a million additional people (460,000) will need to be connected to water every year until 2015. Providing a population of 10.42 million³ with at least 20 litres per person per day (standard minimum), implies that 73 million m³ per year will be needed⁴. However, at the current access rate of 6-8 litres per day, domestic water consumption would still be in the range of 29.2 million m³. Secondly, the projected population may be an understatement given the significant reduction in mortality and other factors. Third, the rapid urbanisation and large scale housing developments coupled with increasing affluence, is likely to increase water use.

Major demand-related issues in Domestic water supply include:

i) Increasing demand, distance and rising cost: The overall cost of abstracting, cleaning and delivering clean water to the population is increasing, raising concerns for future access especially by the poor. Table 6 shows planned sources of water to supply Kigali City under the new Kigali Expansion Plan (Kigali City Master plan, 2006).

Table 6: Projected Sources of Drinking Water Supply for the Kigali City

	Source Area	Amount (m ³)	Location and Elevation
1	Musanze/ Burera	40,000	2,100 masl.
2	Cyuga	8,000	1370 (Gatsata on the outskirts of Kigali city)
3	Muhazi	32,000	1,500 Eastern province
4	Kicukiro	8,000	1400 (Outskirts of Kigali city)
5	Nyabarongo	75,000	1350
6	Yanze	20,000	1460 m Central highlands
7	Mugesera	6,000	1335 m- Southern plains of Bugesera
8	Total	189,000	

Source: Kigali Conceptual Master Plan (2006)

As shown in Table 6, feasible water sources to supply the expanding population of Kigali City are being prospected as far as Burera and Muhazi which will require several kilometres of pipeline. Secondly, more surface water sources are being considered rather than ground water aquifers.

ii) Pollution of water sources remains an issue for drinking water supply. Standards for heavy metals imposed by World Health organisation (WHO) and the GoR have been exceeded in samples collected in various water sources (Table 7). The cost of cleaning water is increasing.

³ Population projection based on 2002 Census (Haguma et al 2008).

⁴ Based on a minimum per capital consumption standard of 20 litres per person per day.

Table 7: Status of Water Pollution by Heavy Metals

	Element	Samples (mg/l)	Standard
1	Barium	1 – 8.5	0.7
2	Lead	0.013 – 0.155	0.01
3	Cadmium	0.002 – 0.155	0.003

Source: Kigali Conceptual Master Plan (2006)

iii) Reliability of water supply systems is reportedly low even for new systems. In Bugesera region, water supply from the recently commissioned pipeline remains unreliable especially during the dry season. Of particular concern for IWRM is that water losses on existing supply systems is high, often exceeding 30%. At least one-third of the rural water systems (about 850 systems) need urgent rehabilitation (MININFRA, 2010). The systemic losses are partly driven by inadequate regulation of water supply and use. The huge public subsidies that public water supply systems enjoy provide incentives for inefficient water supply and use, and make water harvesting unattractive to water users. Subsidies account for up to 40% of water services provided by the public utility - the Energy, Water and Sanitation Authority EWSA) and much more for rural water supply systems.

Indeed, some innovative actions have been undertaken and they appear to be improving efficiency and cost-effectiveness in water supply systems. The devolution of water service delivery responsibilities to district authorities and private sector has reportedly improved the management of rural water supply systems. By 2008, at least 28% of water supply schemes were managed by private operators. This model has improved systems' maintenance, operational efficiency and reduced losses (MININFRA, 2010). Recent rainwater harvesting pilot projects have demonstrated that rainwater harvesting can mitigate water shortages all year round. But scale-up of such innovations will require increased access to appropriate technologies and attitudinal change.

iv) Large scale water supply systems, that are being rolled out to meet urban demand, must be subjected to strategic environmental assessment, so as to establish and address the likely implications for other water uses/needs in the sub-catchments, the sustainability of supply systems and possibility of exploring more appropriate alternatives.

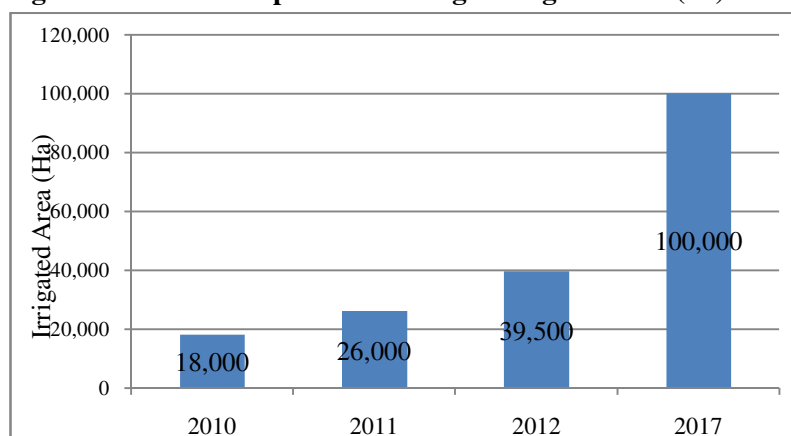
2.2.3 Water for agricultural production

Agriculture is the biggest source of demand for water in Rwanda accounting for up to 70% of the water demand (UNEP, 2009) and is expected to account for 80% of total water demand in 2020. Rwanda's agriculture is predominantly rain-fed. However, with increasingly unreliable precipitation, increased agricultural production will require increased control of all factors of production including water. The GoR is already looking to irrigation to boost agricultural production.

Irrigation Potential and Present Status

Recent studies estimate that Rwanda has a potential of 589,000 Ha of irrigated land, considering all production factors including water needs. According to MINAGRI (2009a), about 300,000 Ha will be irrigated. Presently, irrigation occurs in at least three forms – flood plain irrigation; sprinkler irrigation where water is transported to the crop area either by pumping or channels/canals and hillside irrigation. MINAGRI targets to increase irrigated area from 18,000 ha in 2010 to 100,000 ha by 2017. Figure 4 gives the trend in irrigated agriculture up to 2017.

Figure 4: Planned expansion of irrigated agriculture (ha).



Source:

The six-fold increase in irrigated agriculture over the next seven years will increase the pressure on water resources. Considering that Rwanda's current water utilisation is less than 2% of available fresh water resources (UNEP, 2010), increasing irrigated area is a positive development as it transforms resources into economic productivity and improved livelihoods. There are, however, serious concerns in agricultural water use.

Water use issues in agriculture

Most pressures in agricultural water use will come from increased irrigation, but the impact on internal water resources and trans-boundary water flow will depend on how efficiently water is used. As rainfall becomes unreliable and extreme weather events intensify, Rwanda has shifted to expanding irrigated agriculture and harvesting rainwater. But there are still challenges in agricultural water management. The main issues of concern relate to the following:

i) Low levels of efficiency in agricultural water use: Rwanda's agricultural water use is inefficient. Both rain-fed and irrigation systems are grossly inefficient. Rainwater evaporates very fast and most farmers do not practice improved soil water conservation (e.g. through mulching). The GoR, has realised this challenge, and devised strategies to improve agricultural water management efficiency. Under PSTA II and the Irrigation Master Plan 2010, some 800,000 ha of irrigated agriculture is expected to depend on water harvesting and storage equivalent to 25 billion m³ per year. Efficient irrigation technologies are also being introduced.

ii) *Point source pollution*: there has been unprecedented increase in use of chemical fertilisers and pesticides/fungicides (from around 5% in 2005 to around 18% in 2008 and 16% for fertilisers and pesticides respectively)⁵. While pesticides and fertilisers are boosting production, they are a major source of water pollution. This is exacerbated by limited knowledge among farmers; terrain which facilitate erosion and downstream runoff; and proximity to important water sources.

iii) *Little advance in research and development* to enhance water-efficient production systems. There is little advance in water-efficient cropping or livestock production systems.

2.2.4 Water for livestock development

Rwanda has about 1.6 million head of cattle (NISR, 2010). Most of these are located in the semi-arid rangelands of the eastern province where water is scarce. Water development is thus a major challenge for livestock production. Inadequate access to clean water affects livestock productivity especially during the dry season. Pastoralists and farmers often force their way into areas where there is sufficient water, including illegally entering National Parks⁶. Moving livestock often causes conflicts, diseases and loss of productive time. Communal watering points are difficult to maintain and sharing water among humans and livestock results in contamination (e.g. trampling and cow dung). Demand for water for livestock has also come from the *Girinka* (One Cow for every household) programme. According to RARDA Strategic Plan, some 15,000 cattle will be distributed to poor households by 2012. This will increase water consumption that must be planned for if the programme is to succeed.

With support from the International Fund for Agricultural Development (IFAD) and the African Development Bank (AfDB), the GoR has rolled out large scale infrastructure investments, notably construction of valley dams to increase water availability for livestock.

2.2.5 Fisheries and aquaculture development

As fish cannot survive out of water, so can't the fishing industry and related livelihoods without water. Rwanda's fishing industry is underdeveloped but has considerable potential for growth. Fisheries contributed 0.4% of the GDP in 2006. In 2008, 3,100 tonnes of fish were produced and 0.6% of agricultural households depended on fishing or fish farming (NISR, 2010). Fishing activities are mostly confined to Lakes Kivu, Cyohoha, Mugesera and to a lesser extent, the small lakes in the Akagera National Park and Akanyaru wetlands. The GoR is investing considerable resources in revitalising and expanding the fisheries sector. Several aquaculture projects have been licensed, and in the next 10 years, aquaculture and capture fisheries development are expected to increase. This could exert more pressure on water resources and introduce pollutants. Strategic

⁵ National Institute of Statistics of Rwanda (2010): National Agricultural Survey, 2008. February 2010

⁶ <http://www.rarda.gov.rw/spip.php?article32>

environmental assessment will assist minimise negative impact and harmonise with other water uses.

2.2. 6 Water for industrial development

Industrial growth is a key driver of water demand both from industrial production perspective as well as the stimulation of service sectors and urbanization which trigger domestic demand. The National Industrial Sector Promotion Policy, 2006 seeks to increase industrial production from 7.6% in 2006 to 12.5%, in order to increase contribution of the industrial sector to GDP from 17.3% to 26.5%. Rwanda's industrial sector is projected to grow significantly in the next 10 years given the GoR emphasis on value addition to local production.

Production and processing of fully washed coffee - Rwanda's fastest growing and most successful industry — is both an intense water user and polluter. As the number of coffee washing stations (CWS) is expected to increase from 46 in 2005 to 240 by 2012, it implies water use in coffee processing will increase as could the level of pollution. A tonne of fully washed coffee is estimated to consume about 30 m³. In 2010, production was expected to be 44,000 metric tonnes implying that at least 132,000 m³ of water was consumed.

Mining is an important economic activity using a lot of water in Rwanda. In the context of WRM, it is considered as an industrial activity because water is an input in the processing. Small-scale and artisanal mining activities, which dominate the mining sector in Rwanda, are inefficient water users. Stone and sand mining have degraded river banks and river-beds, resulting in water pollution, declining stream flow and drying up of some streams. There are, however, initiatives to promote water-efficient and environmentally friendly mining activities. These include subjecting mining activities to environmental impact assessments; training artisanal mining operators in good practices; and incentivizing mining operators to invest in modern appropriate technologies.

Other industrial activities that have implications for water demand include agro-processing (sugar production, milk and fruit processing), textile production, tea processing, bottled water production, leather tanning and clay products manufacturing.

Methane gas exploration and exploitation in Lake Kivu has brought another dimension to the mining sector in Rwanda. About 65 billion m³ of usable methane were discovered at 250 m below the surface of Lake Kivu. With loans from the AfDB, the GoR is working to generate as much as 175 MW of electricity from methane gas. The natural gas mining has implications for IWRM from a range of perspectives: 1) it will be a major boost to the energy production, thereby alleviating pressure on water and other natural resources; but 2) being an under-water resource, there are concerns for surface water pollution, quality, ecosystem disturbance, navigational and infrastructure safety; 3) as the Lake Kivu is shared, there are transboundary implications, including marine security; 4) capacity development concerns especially the complexity of the industry, including managing the public-private- partnerships (PPP) involved.

The GoR understands these concerns and has invested considerably in ensuring safety, security and productivity of the methane gas programme. The integrated approach to WRM will further strengthen the sustainable and productive management of the methane gas exploitation.

2.2.7 Water for energy development

Electricity meets only 3% of Rwanda's energy needs, mostly from hydro-power and thermal sources. The GoR has set a target to connect at least 50% of the population to electricity by 2017. To meet this and other industrial demands, electricity generation must be increased from 69 MW in 2009 to 130 MW by 2012. A Hydropower Atlas has been developed with 333 potential hydropower sites of varying sizes identified. Trans-boundary power potential has also been explored and Rwanda's potential share of the power is 115 MW. Trans-boundary projects are one of the mechanisms to sustain Rwanda's interest in TWRM.

Rwanda is also focusing on hydro and other renewable energy sources partly because of environmental and climate change concerns. Hydro-power expansion will reduce use of hydrocarbons (especially diesel-powered thermal power plants, kerosene, candles), and alleviate the pressure on forests and other biomass resources which provide around 86% of energy needs. In view of the multiple interests involved in areas where hydro-power potentials exist, designing multipurpose dams should be considered, as they can help address multiple water needs for agriculture and livestock; recreation, fish production, domestic consumption and navigation, while also providing regulating services as flood control and ecosystem sustenance.

Geothermal energy exploration has been on-going since 1982 (www.mininfra.gov.rw), but has only intensified recently as GoR rolls out its energy diversification drive to generate cleaner energy. The main concern with geothermal development in Rwanda is that the potential sites are located in ecologically sensitive areas⁷ which are also national water towers. These areas are also highly susceptible to disasters, including floods, landslides, earthquakes and volcanic eruptions. Secondly, the cultural and other values including tourism do not seem to have been considered.

2.2.8 Water for infrastructure development

Infrastructure development is at the heart of progress towards realising the Vision 2020 aspirations. Construction of roads, bridges and buildings, expansion of housing in urban and peri-urban areas and construction of grouped settlements (*Imidugudu*), consume a lot of water. However, water consumption in infrastructure development is often not recorded. Large scale water supply systems are being planned to support large scale infrastructure projects – notably the Isaka-Kigali Railway and the New Bugesera International Airport, which need bigger supply capacities.

⁷ The main areas being explored for geothermal energy are the volcanoes and the faults near Lake Kivu. Previous prospecting identified Mashyuza, Gisenyi and Ntaresi as potential sites.

The increasing urbanisation, projected to reach 30% by 2020, is a major factor in infrastructure expansion from two perspectives – increasing urban population is increasing demand for infrastructure, while the concentration of essential infrastructure like housing, sports, energy, health and education facilities, are contributing to rural-urban migration especially of young people in search of employment. This has a net increase in domestic water demand. In the context of IWRM, however, infrastructure development has increased impervious surfaces resulting in flush floods, pollution and accidents from storm water. Proper management of storm and roof-top water through harvesting and storage reservoirs, maintaining urban green spaces, protecting urban wetlands, and promoting eco-friendly construction technologies, will be important.

2.2.9 Water for transport

Rwanda's water transport is evolving. An inland navigation system is being developed, and recreational transport is increasing. At least 3 projects to develop river and lake transport have been initiated. These include feasibility studies for construction of Quays and Naval Shipyard on Lake Kivu, and Navigability of River Kagera (MININFRA, 2008a). Water transport has much lower unit cost compared to other modes, making it commercially viable. It is important to note, however, that water navigation at any section of a river or lake will require maintenance of a minimum water level, especially for the operation of ports, harbours and docking. This might affect options for water use both upstream and downstream. Secondly, water navigation increases human traffic and developments along the lake shores/river banks, with concerns for pollution and other forms of degradation.

2.2.10 Water for tourism and recreation services

Rwandan natural waters (lakes, waterfalls, hot springs, craters,) are becoming important recreational facilities, and a major boost to the fast growing tourism industry. In the last 10 years, Hotels, campsites and other recreational facilities have been established around major lakes and wetlands - from Lake Kivu to Lake Muhazi and as far as Lake Burera in the extreme North. There are concerns for water pollution and waste management; degradation of lakeshores and river banks through beach development, human traffic and loss of biodiversity e.g. birds, fish and other aquatic biodiversity. Uncontrolled beach development negatively impacts aquatic ecosystems. It should be emphasised that recreation and tourism require strict water quality and may be incompatible with other activities like aquaculture or effluent discharge. IWRM approaches will promote coordinated water-related development.

2.2.11 Water for ecosystems maintenance

Water is one of the most important ecosystem services for which there is no substitute. In turn, however, ecosystems require water to continue functioning. If water abstraction leaves less than the minimum required for ecosystems to function, there is breakdown in the flow of ecological, productive, social and cultural services. Rwandan ecosystems are stressed as evidenced by

increasing water shortage and water-related disasters (UNDP/UNEP/GoR, 2007). The drying up of Lake Cyohoha North and subsequent restoration underscores the need to maintain ecosystems.

In a nutshell, the apparent water shortages in the face of increasing demand are bound to increase. This calls for innovative water saving approaches – cleaner production systems, efficient technologies in domestic and productive use (e.g. water-saving flush toilets, drip irrigation, run-of-river hydropower schemes,..) and use of regulatory instruments – differential pricing above certain thresholds, prohibitive tariffs for luxury users and encouraging waste water re-use.

2.3 Transboundary issues and implications for internal water utilisation

Nearly all (95%) of Rwanda’s water resources originate from within the country and only about 5% from outside its territory, essentially Burundi. However, Rwanda has a net outflow mainly to the Nile via Akagera and to the Congo via Rusizi and Sebeya. As almost all of Rwanda’s available fresh water resources are shared, internal utilisation has to consider downstream implications. Table 8 shows water availability in comparison to other countries in the Nile basin.

Table8: Water Availability and Use in the Nile Basin Countries

	Country	Total Population ('000s)	Precipitation rate (mm ³ /yr)	Total Available water (km ³ /yr)	Incoming Waters (%)	Outgoing Waters (%)
1	Burundi	7068	1200	15	35	14
2	Egypt	73390	100	58	97	0
3	Eritrea	4297	400	6	56	35
4	Ethiopia	72420	800	122	0	80
5	Kenya	32420	700	30	33	30
6	Rwanda	8481	1200	5	0	81
7	Sudan	34333	400	65	77	30
8	Tanzania	37571	1100	91	10	14
9	Uganda	26699	1200	66	41	56

Source: FAO (2005). AQUASTAT

Rwanda has one of the lowest per capita water withdrawals, suggesting that there is scope for extensive water development. However, some downstream users face significant water stress and there are challenges in internal allocations between competing sectors. Table 9 presents water withdrawals by country in the Nile Basin.

Table 9: Status of water abstraction in Rwanda compared to the Nile Basin and Africa (2008)

	Country	Total Freshwater withdrawal (Billion m ³ /yr)	Total Per capita withdrawal (m ³ / yr)	Fresh water withdrawals as % of Total Renewable Water Resources
1	Burundi	0.3	42.6	2.3
2	DRC	0.4	6.7	0.03
3	Egypt	54.3	937	94.7
4	Eritrea	0.6	121.7	9.2
5	Ethiopia	5.6	80.5	4.6

6	Kenya	2.7	72.4	8.9
7	Rwanda	0.2	17.6	1.6
8	Sudan	37.32	1,025	57.9
9	Tanzania	5.2	144.2	5.4
10	Uganda	0.3	11.5	0.5
11	Africa			

Source: UNEP (2010): Africa Water Atlas

Shared waters has provided a natural way of fostering regional cooperation as common interests around a scarce resource and shared ecosystems have brought cross-border cooperation among peoples and governments. The Economic Community of the Great Lakes Countries (CEPGL), the Lake Victoria Basin Commission (LVBC) and the Nile Basin Initiative (NBI), demonstrate that there are political and socioeconomic benefits beyond water. Through cooperation in TWRM, there are opportunities to leverage resources for water development and address complex issues like climate change.

A number of trans-boundary cooperation frameworks have emerged viz: NBI, Lake Victoria Basin Commission, Kagera Basin Commission, and Greater Virunga Trans-boundary Cooperation Framework. These provide opportunity to improve TWRM. Rwanda is not part of the International Commission on the Congo River Basin in which 4 of the basin's 11 countries are cooperating (UNEP, 2010).

2.4 Summary of the main Drivers for water demand and supply in Rwanda

A synoptic review identifies the following as key factors shaping water demand:

- 1) **Population growth:** the unprecedented increase in population has triggered huge demand for water – for drinking and hygiene, sanitation and other domestic uses; and indirectly through demand for food, industrial products, recreation and other amenities. Population growth has increased pressure on land and forests for agriculture and settlements, resulting in land degradation, siltation of water bodies and reduced water quality.
- 2) **Poverty:** poverty has pushed many Rwandans to settle on marginal lands (like steep hills and rangelands), engage in sand and stone mining to survive and cultivate wetlands, resulting in severe degradation and pollution. Poor farming techniques have destroyed important catchments and critical watersheds. Both rural and urban poor lack basic sanitation, and are polluting water sources through poor sanitation and inappropriate settlements. The cost of availing water to poor people is high and maintenance of water infrastructure is low.
- 3) **Policy and governance focus:** The drive to realise Vision 2020 and EDPRS targets, has triggered water demand for irrigated agriculture; livestock development; hydro-power and urban water supply infrastructure; urbanisation and settlement re-organisation, etc.
- 4) **Climate change:** increasing extreme events like prolonged drought have raised concerns for water access, even in areas hitherto known to be water secure. With reduced and increasingly unreliable rainfall, agriculture – the biggest water user – is expected to rely on irrigation. This will, undoubtedly increase the pressure on water resources.

- 5) **Technology:** Adoption of appropriate technologies is important to ensure adequate and clean water availability and accessibility. Eco-technology applications have enhanced efficiency e.g. in coffee washing stations water use was reduced by up to 4 times.
- 6) **Urbanisation and human settlements re-organisation:** Rwanda has one of the fastest growing urban populations. Urbanisation is associated with change of lifestyles and increased water use for housing, sanitation services, recreation, etc. This increases pressure on water resources. Urban per capita water consumption is up to 5 times more than for rural areas.

2.5 Water Resources Development and Management: Sub-sector Performance Review

This section presents an overview of the WRM sub-sector performance in a forward looking perspective.

2.5.1 WRM Sub-sector priorities, investment plans and financial performance

WRM sub-sector performance is reviewed in light of recent reforms in the water sector.

The main EDPRS priorities for WRM include: water resources planning (developing and implementing the WRMandD Master Plan); water quality monitoring; controlling water weeds, water quality monitoring and rehabilitating critically degraded watersheds.

Budget performance over the last MTEF cycle is summarised in Table 10. The figures indicate that budget allocation to WRM has been low but outturn is impressive (above 90% for most of the period 2006 – 2008).

Table 10: Sub-sector Budget Performance over the Period 2006 - 2008 (RwF million)

WRM Component	2006			2007			2008		
	Budget	Outturn	%	Budget	Outturn	%	Budget	Outturn	%
Legal , Policy, Regulatory and Institutional framework	396.2	571.5	144	3,630.5	3,534.8	97	107.8	52.6	49
Management of Water Resources	172.5	7.9	5	494.3	466.7	94	161.7	126.4	78
Water Access for economic purposes	1,107.3	936.6	85	0	0		14.8	0	0
Total WRM	1,676.0	1,516.0	90	4,124.8	4,001.4	97	284.3	179.0	63

Source: Ministry of Natural Resources (2009). Joint Sector Review, 2008.

This is largely because WRM was a small function in a sector dominated by water supply. The period 2008–2010 has been more of transition, characterised by sectoral reforms where WRM was detached from water supply, and the Government transited from the January – December Financial to year to the July – June Financial year in conformity to the EAC. This created half-year budget periods.

In terms of forward looking, the budget allocation for WRM during the period is presented in Table 11. The WRM sub-sector share of the ENR sector budget will increase from 4.3% to 15% in 2011/12 and 9.8% in 2012/13.

Table 11: Public budget allocation for WRM for the MTEF period 2010/11-2012/13

ENR Sector Priorities/ Programmes	Priority issues for/ with impact on WRM	Allocated Funds (RwF millions)		
		2010/11	2011/12	2012/13
Administration and Institutional development	Improved water resources governance	426.47	673.07	871.97
Environment and climate management	Watershed protection; water quality and climate change monitoring	5505.47	3999.26	3078.28
Sustainable land management	Catchment protection and erosion control	4291.02	7419	7833.23
Integrated water resources management	Water resources assessment and monitoring; water shed rehabilitation; water quality	692.53	3007.13	3821.45
Institutional Strengthening	institutional framework for IWRM	0.5	0.52	0.53
Forest management and Afforestation	Watershed and catchment afforestation to control non point pollution	4534.71	4118.99	22677.33
Promotion and value addition to mines and quarries	Efficient use of water; control of pollution	661.88	787.38	748.39
Total		16,112.58	20,005.35	39,031.18

Source: ENR Joint Sector Review, 2010.

As shown in Tables 10 and 11, the WRM programme received little funds. The main explanation was absence of a clear strategy and institutional structure for WRM. Nonetheless, considerable funds have been allocated to WRM activities in other ENR programmes. The main WRM-related achievements from funding in other sectors are summarised in section 2.5.2.

Analysis of financial allocation and budget performance for the WRM sub-sector is difficult, since allocations are still made on institutional basis and many of the WRM activities are scattered in different institutions and sectors. Yet it is important to respond to a question “How important is water resources to Rwanda’s development” using public investment allocation as a litmus test. A Public Expenditure Review (PER) for the entire water sector will assist to track funding for WRM, and serve as a tool for effective resource mobilisation, allocation and utilisation.

2.5.2 WRM investments in other sectors

Outside the ENR sector, significant investments in WRM-related activities are being made in the agricultural sector, which accounts for more than two-thirds of water withdrawals. At least half of the sub-programmes under PSTA II Programme 1 (Intensification and Development of Sustainable Production Systems) are related to WRM as Table 12 below shows.

Table 12: Agricultural Sector investments in water resources development and management

Sub-programme	Budget	Secured Funding	Annual Allocations of secured funding		
			2009/10	2010/11	2011/12
Sustainable NRM, water and soil conservation	158,571,429	30,943,640	9,462,630	9,742,581	11,738,429
Integrated Systems of Crop and livestock	60,481,118	27,104,143	6,945,362	12,194,187	7,964,594
Marshland development	41,188,900	25,227,496	5,926,128	8,754,338	10,547,030
Irrigation Development	131,190,000	78,722,569	20,482,260	29,885,327	28,354,982
Supply and use of agro-inputs	215,690,211	169,617,651	53,050,600	54,410,524	62,156,527
Food security and Vulnerability Management	17,700,000	1,843,343	950,408	460,932	432,003
Total Programme 1	624,821,658	333,458,842	96,817,388	115,447,889	121,193,565

Source: MINAGRI (2009). Agriculture Sector Investment Plan (2009- 2012)

As indicated in Table 12, only sub-programme 1 appears to address supply-side issues (watershed protection, erosion control and water harvesting). The other two sub-programmes, (marshland and irrigation development) seek to increase water abstraction for production. These sub-programmes have implications for water regulation, water allocation and water utilisation efficiency.

Table 13: Selected Agricultural SIP Targets and Implications for WRM

	Strategic Indicator/ Target	Implications for IWRM
1	852,000ha of additional land protected against soil erosion, using radical and progressive terracing	Reduced sediment loads due to run-off from hillsides
2	70 new valley dams and reservoirs constructed	Increased water conservation/storage; reduced water stress
3	270,000 households reached by the “One Cow Program”	Increased consumption of water but one cow per each household could be an effective incentive to promote rainwater harvesting at household level.
4	9,000 Ha additional area of marshlands developed	Reduced capacity of water reservoirs for sediment management;
5	13,000ha of hillside area irrigated, from 130ha	Increased water use; risk of increased agro-pollution; but huge opportunity/ incentive to conserve run-off water and control erosion and downstream sedimentation; Need to scale-down agricultural activities in wetlands.
6	Legal provision for water user associations and tenure for irrigation systems created	Increased community-participation in water governance; opportunity to implement polluter-pays and PPP models.

Source: MINAGRI (2009). PSTA II

2.5.3 Achievements in watershed protection and water resources management

The GoR has implemented interventions in watershed restoration and catchment protection. The most significant ones are summarised in Table 14.

Table 14: Summary of Performance for Selected WRM-related Projects

Programme/ project	Total Investments (RwF Mn) and Financing sources	Implementation Period	Key Achievements made in WRM	Geographical coverage
Rainwater Harvesting Pilot Project	Euros 450,000	2007-2010	Pilot demonstration of rainwater harvesting and impact on livelihoods	Bugesera region
KIEM Gikondo Restoration)	US \$ 350,000 (excluding relocation costs) UNHABITAT, UNEP/UNDP	2005 - 2010	Funding secured; land for relocation of industries secured; and compensation plan developed.	Kigali city drained by the Nyabugogo river/wetland
Rehabilitation of Critically Degraded Watersheds	Frw. 475,851,016 GoR	2008 - 2012	Planting trees along the Sebeya riverbanks covering about 90% of the targeted 511 Ha; Some 115 households successfully relocated from proximity to R. Sebeya; On course to relocate another 153 HHs in Rubavu district. Technical studies on other critical watersheds undertaken.	Western Province districts of Rutsiro, Ngororero and Rubavu); the river pours into L. Kivu near Gisenyi.
IMCE	\$ 4 million GEF/World Bank	2005 - 2011	Critical Wetlands mapped and community catchment management committees established. Guidelines and tools for sustainable wetlands use developed. Community-based watershed management committees have been established and trained around watersheds and wetlands.	Critical wetland and biodiversity areas around the country.
NEYP	US\$ 6,000,000	2008-2011	Protecting the banks and catchments of R. Nyabarongo System from land degradation and solid waste pollution; creating employment opportunities for youth.	Nyabarongo River catchments covering 17 districts
Water for Livestock Infrastructure Dev.	US \$ 11.55 million, AfDB	2010 -	Support water harvesting infrastructure, including the study and construction of valley dams and reservoirs on a number of sites.	Mostly in the drier regions of Eastern province

Source: Various Project Documents in REMA, MINELA and MININFRA

While these interventions are yielding good results, they are project-based and often short-term. This makes it difficult to synergise and scale up interventions. Early lessons suggest that secure financing and cross-sectoral collaboration are important for the success of IWRM interventions.

2.5.4 Pollution control and water quality monitoring

Declining water quality is a challenge to WRM because it reduces access to and use of water, and increases the cost of providing water services (domestic water has to be treated; sediment loads reduce functionality and increase water treatment and maintenance costs,..). Data on water quality is scanty and scattered. A 2002 country-wide study on water quality revealed evidence of pollution. It also indicated that there were regional variations in water quality and forms of pollution (MINITERE/SHER, 2005). The main source of water pollution in urban areas is lack of adequate sanitation, and inadequate and inappropriate waste management practices. In Kigali city, for example, 60% of the population depends on shallow pit latrines. Only 24% of the solid waste generated in Kigali city is disposed of at the Nyanza land fill (Kigali Master Plan, 2006). The landfill itself is inappropriately constructed and located, and is reported to be a source of pollution for downstream water sources through leaching (REMA, 2010; UNEP, 2009).

Urban water pollution is worsened by large informal settlements around important water sources and catchments. Water quality monitoring is limited. Central sewage and sludge monitoring is hardly done.

The impact of pollution on water goes beyond consumption. It affects ecosystem functioning, resulting in ecological problems like loss of biodiversity. It also affects water uses that require high quality water like recreation and tourism.

There are on-going efforts to improve water quality, albeit at a small scale. This includes rehabilitation of a few Limnometric Stations and selected water quality analysis.

2.5.5 Water hyacinth control

The Water hyacinth (*Eichhornia crassipes*), is one of the main threats to Rwanda’s waters. An invasive species native to the Amazon, *E. Crassipes* has caused extensive degradation of water bodies from Burera to Lake Victoria where it has affected fishing, hydropower generation, navigation, water supply and caused biodiversity losses. Extensive proliferation of the weed has been aided by eutrophication and absence of natural enemies for biological control. Water hyacinth control activities have been done in Lakes Cyohoha, Rweru, Ihema and other small lakes but the scale of activities is too small and too localised to create meaningful impact.

2.5.6 Water governance framework – coordination and monitoring

The water sector for a long time focused on infrastructure development for water supply, hydro-power production and agriculture. Consequently, little resources were allocated to WRM activities. However, the 2008 reform that de-linked Water Supply function from WRM gave it prominence and exposed the gaps which the GoR is now addressing. Table 15 presents the main institutions and their roles in the implementation of WRM policies and strategies.

Table 15: Institutional Roles and Responsibilities in IWRM Policy Implementation

No.	Institution	Roles and responsibilities
<i>Policy and Oversight Institutions</i>		
1	Ministry of Natural Resources (MINIRENA)	Ensure that the WRM policy and strategy are passed by Cabinet and communicated to stakeholders; Present and defend the WRM strategy budget and proposed institutional reforms to cabinet; lead/ actively participate in resource mobilisation; provide policy oversight to Strategy implementation including enforcement of accountability and continued alignment to high level political interests.
2	Ministry of Local Government (MINALOC)	Establishment, development and facilitation of the management of efficient and effective decentralized government systems capable of law enforcement and delivery of required services to the local communities.
3	Ministry of Agriculture, Animal Resources (MINAGRI) and affiliated agencies	Integrate IWRM principles into agricultural policy priorities and budgets; Participate actively in the WRM sector coordination platforms; report regularly on IWRM activities implemented in the agricultural, livestock and fisheries sectors.
4	Ministry of Infrastructure	Development of institutional and legal frameworks, national policies,

No.	Institution	Roles and responsibilities
	(MININFRA)	strategies and master plans relating to water supply and sanitation, energy and transport subsectors.
5	Ministry of Health (MINISANTE)	Policy formulation and promotion of hygiene and public health; Integrate IWRM principles and activities in the sectoral strategies and budgets.
6	Ministry of Family and Gender Promotion (MIGEPROF)	Coordination of gender, promotion and mainstreaming and family planning activities.
7	Ministry of Education (MINEDUC)	Prioritise, provide political advocacy and budget support to the training of WRM professionals; Promotion of IWRM research and technological innovation, as well as basic education on water resources management through policy reform and curriculum reviews.
8	Ministry of Commerce (MINICOM) and affiliated agencies	Policy formulation and promotion of investments by the private sector in water resources management/industries and manufacturing.
9	Ministry of Foreign Affairs And Cooperation (MINAFFET)	Foreign and diplomatic relations including regional and international cooperation over shared waters.
<i>Financing Institutions</i>		
10	Ministry of Finance, Planning and Economic Development (MINECOFIN)	Lead in internal and external resource mobilisation; Advocate for IWRM prioritisation within budgets of WRM-related sectors and provide adequate budget to WRM Strategy implementation. Support capacity building for financial management and accountability by implementing agencies including decentralised entities.
11	Development partners	Provide technical and financial resources for implementing the WRM strategy and related sectors; Assist in developing partnerships and linking the implementation outcomes to international commitments and targets e.g. MDGs 1 and 7.
<i>Regulatory Institutions</i>		
12	Rwanda Environment Management Authority (REMA)	Develop regulations and ensure protection and conservation of the Environment and natural resources across the Country.
13	Rwanda Utilities Regulatory Agency (RURA)	Integrate the IWRM targets for infrastructure and utilities within its regulatory framework and priorities. Will monitor enforcement of IWRM regulations and laws into water-related utilities' planning, financing and implementation to ensure compliance.
14	Rwanda Bureau of Standards (RBS)	Provision of standards based solutions for Consumer Protection and Trade promotion for socio-economic growth in a safe and stable environment.
15	Rwanda Natural Resources Authority (RNRA)	As the overall institution responsible for execution of the WRM Strategy (as part of the wider NRM mandate), RNRA will plan, budget and implement activities related to Outcome 1 as well as monitor and report on the strategy implementation, including coordination of other WRM actors.
<i>Management/service Institutions</i>		
16	Energy, Water and Sanitation Authority (EWSA)	Integrate the principles of IWRM in water supply, sanitation and electricity generation and supply infrastructure; promote water use efficiency by promoting appropriate technologies and providing information, knowledge and appropriate incentives to clients and stakeholders; Plan for and mobilise resources for IWRM activities within EWASA planned activities, including sensitisation of clients.
17	Rwanda Development Board (RDB)	Support enforcement of IWRM regulations and laws by incorporating them into Investment regulation and monitoring instruments including incentives and information packages; Facilitate registration and operation of investors in water services programmes; and support services to investors.
18	User Communities	Management of water resources in the course of their productive, consumptive and non-consumptive activities on a day to day basis
19	Local Government Authorities	Plan, mobilise resources, supervise and monitor the implementation of WRM projects and activities in line with the overall GoR policies, laws and

No.	Institution	Roles and responsibilities
		strategies related to WRM; Report regularly on WRM activities implemented.
20	Private Sector	Provide water-related services including design, construction, operation and maintenance of water supply infrastructure; operation and maintenance of efficiency and safety of water-related infrastructure; provide training and advisory services to water users, Government and non state personnel; Operate or provide other water-related services.
21	Non Governmental Organizations (NGOs)	Supplement the public sector efforts in water resource management and development. Empower communities and Water user groups with skills, knowledge and information in IWRM; Enhance advocacy and accountability in water service delivery and watershed protection.

2.6 Stakeholder Analysis Summary

One of the main issues that make IWRM complex is the multiple stakeholders involved. Table 16 summarises the key stakeholders and their areas of interest.

Table 16: Mapping Stakeholders, Interests and Issues in Rwanda's WRM

	Category	Stakeholders	Institutions	Primary interests and Key Issues
1	Director Water users	Domestic consumers	Urban and rural households	Managing communal facilities; user fees and charges; Access to water by urban poor; Private water flow; Rural Vs urban water supply systems
		Institutional Users	Educational institutions; Public health facilities; Government buildings and Installations;	Upstream-downstream farmers
		Farmers	Irrigated and non irrigation farmers; Livestock farmers and pastoralists	Commercial and subsistence farmers; Upstream-downstream user rights; payment of user fees
		Commercial users	Hoteliers; Industrialists; mining concessionaires;	User licences/fees;
		Water suppliers	EWSA; Private water suppliers; Bottled Water Companies; Vendors	Water use interests; rates and licences;
2	Non direct users	Energy generators/ power companies	EWSA	Water for hydro -and geothermal power generation; Safety, O&M of installations
		Marine transport operators	MININFRA; RDF and RNP	Marine safety and immigration issues; maritime boarder issues; pollution
		Fishers/Fish farmers and Aquariums	Water suppliers ; fishers; hotel/ recreation operators;	-licences and fishing rights; organisational capacities; illegal cross-border fishing;
		Recreation operators	Beaches, sports and swimming pools	User rights and licences; Efficiency, Pollution and waste management;
3	Government	Policy ministries and Agencies	-MINIRENA, MINAGRI, MININFRA, MINICOM, IPAR; Disaster Ministry; Districts	Policy, strategy and legal framework for WRM; water demand and supply issues; Safety and Disasters mgt issues
		Regulatory Agencies	REMA, RBS, RURA	Environment and Water quality standards monitoring and enforcement;
		Local Governments	District and lower structures	Implementing Government plans; mobilising communities and resources to implement local CDD actions and manage water facilities through Water User Committees(WUCs);

	Category	Stakeholders	Institutions	Primary interests and Key Issues
4	Service Providers	Private contractors	Drilling companies; Vendors,	Capacity; operational standards
		Trainers and Researchers	Universities; Research Institutions;	Knowledge generation and management; HR capacity development; advocacy
5	Development partners:	Donors/ Funding agencies,	SIDA, WB, AfDB, UNDP, GTZ, EU,	Providing technical and financial support to WRM public investments
		Trans-boundary Water Cooperation Agencies	NBI/NELSAP; LVBC, CEPGL	Trans-boundary conflict management; Riparian countries' capacity; Cooperation framework;
		CSOs	Nile Discourse Forum; International Water Partnership	Advocacy, networking and WUG capacity development
6	Riparian Countries	Riparian basin countries	NBI, LVBC and Congo Basin countries	Climate change and water quantity, quality and flow; joint developments in WRM infrastructure; water user rights and cooperation framework

From Table 16, it can be observed that there are multiple interests from wider basin levels to the smallest sub-catchment. A key issue for IWRM is to foster coordinated planning and monitoring.

2.7 Summary of the Water Sub-sector SWOT

The analysis of the Strengths, Weaknesses, Opportunities, and Threats (SWOT) in the water sub-sector is summarised in Table 17.

Table 17: SWOT Analysis for the Water Sub-Sector

Strengths	Weaknesses
<ul style="list-style-type: none"> Supportive policy and legal instruments (Water Policy 2010; Water Law 2008, Environmental Law 2005); Rwanda has embraced global principles for IWRM (including human rights; management of international waters, protocols on sanitation); ENR sector SWAp will enhance coordinated planning, financing and implementation of IWRM activities; Platforms for citizens' participation in water governance (Water User Committees, Irrigation Committees); In-country capacity development opportunities (NUR, KIST, KHI, ISAE are training WRM experts and technicians); Good practices in Watershed and catchment rehabilitation Expertise in water harvesting and waste management; Emerging institutional framework for water regulation (RURA, Water Associations, irrigation Committees); Civil Society Coordination frameworks (<i>RWASEF, Nile Basin Discourse...</i>); <p>Increasing investment in WRM activities by other sectors (e.g. PSTA II focuses on soil and water conservation)</p>	<ul style="list-style-type: none"> Low per-capita water availability and storage capacity; Inadequate coordination among WRM actors; Limited innovation and modern technology use (GIS/RS; tertiary water use thru recycling; EcoSan,); Insufficient economies of scale for WATSAN use and limited use of alternative WATSAN techniques; Limited public investment- There is imbalance in public investments between Water supply and WRM; Insufficient technical standards for water resources; Inadequate and outdated infrastructure; Inadequate human and institutional capacity Limited information and low institutional memory (good practices not documented); Limited participation of non state stakeholders (CSOs, private enterprises) in WRM activities; Low private sector capacity especially in technical and policy advisory. Inadequate water regulation and legislation; Low awareness of water as a finite scarce resource important for life and ecosystem sustenance;
Opportunities	Threats
<ul style="list-style-type: none"> A sustainability-driven national development Vision 2020 and supportive strategies (EDPRS 2012, Govt Plan 2017); Strong political will at the highest level of Government to embrace sustainable WRM principles; Decentralised Governance and Service Delivery 	<ul style="list-style-type: none"> Increasing pressure on water resources from both external and internal population needs; Changing priorities for external financing agencies; Pressure of land leading to destruction of critical watersheds and water catchments;

<p>framework provides structures and platform for local stakeholder mobilisation and participation in WRM;</p> <ul style="list-style-type: none"> • International relations - important to mobilise resources and implement water cooperation programmes; • TWRM programmes and Cooperative Frameworks (NELSAP; LVBC); Rwanda's active participation in regional bodies is an opportunity to influence TWRM; • Increasing availability of cost-effective technologies (water harvesting, treatment, Ecosan,...); • Potential PPPs and private sector financing and investments; • Sustainable ENR financing initiatives (e.g. FONERWA); • Donor commitments to support WRM activities; Donor harmonisation and alignment enable predictability of external financing; • Alternative energy sources (Solar, methane gas); <p>ICT infrastructure in public agencies (websites facilitate information storage and easy accessibility)</p>	<ul style="list-style-type: none"> • Incomplete cooperative frameworks for the management of shared waters in the region; • Lack of harmonised interests and approaches among countries sharing the Nile waters; • Insufficient knowledge and skills in WRM among partner institutions and stakeholders • High levels of poverty and high population density in upstream areas of major basins; • High level of vulnerability to climate change; • Slow response to the Paris Declaration/ principles by some development partners. • Insufficient investments in contingency and disaster preparedness (droughts, floods, landslides,...); • Over-reliance on rain-fed agriculture;
---	--

2.8 Key challenges to effective water resources management in Rwanda

Rwanda's WRM sub-sector faces a number of challenges. The key ones are:

- i) **Reversing and preventing land degradation and water pollution** which is responsible for siltation and sedimentation of rivers and lakes. Land degradation is mainly caused by poor land use practices, including inappropriate use of agro-inputs.
- ii) **Meeting the growing water demand amidst high population growth and climate change:** Population growth is a major challenge to meeting water demand and a potential driver of hydro-political conflicts. Within the 2 basins, Rwanda's population density is the highest 400 persons per km² on the Congo side (UNEP, 2010) and projected to be 515 persons per km² on the Nile Basin side by 2015 (NBI, 2008).

Of particular concern are the increasing climate change threats. Climate change in Rwanda is already having serious impacts on water resources and other sectors⁸ (see box 2). Erratic rains have lately been experienced with destructive floods, landslides and strong winds, resulting in loss of lives and destruction of property and public facilities. The limited capacity to manage climate change-related disasters imposes huge risks to the economy and livelihoods.

- iii) **Managing multiple interests in water resources and coordinating sectoral activities:** lack of coordination is evident in the planning and utilisation of water resources. Cases of sectoral

⁸ Recent climate change predictions and impact studies in the Kagera basin, a third of which is in Rwanda, have projected a trend of annual and seasonal temperature increases of 1 – 6 °C, and up to 3 times change in precipitation levels compared to the 1961-1990 base climate (COWI 2008). This is expected to have a major impact on the hydrological system, particularly the river flows and water resources, with subsequent adverse repercussions on agriculture, transport and industry. In addition to recent incidences of prolonged droughts, erratic rains and severe floods, analysis of historical climate data indicate a clearly upward trend of between 1- 1.5 °C (REMA, 2010) confirming that climate change is real in Rwanda.

conflicts in water use have been reported at various levels, increasing the urgency for introduction of a strong water governance framework.

iv) Institutional Capacity: developing a robust institutional structure and establishing a reliable water resources information system in a short time, given the on-going fast-paced development process, and the cross-sectoral and trans-boundary nature of WRM issues.

v) Water availability is of particular concern: Rwanda is a water-stressed country even though surface water is relatively abundant (UNEP 2009, REMA, 2010). With increasing and rapidly urbanising population, industrial and commercial activity, and declining ecosystem capacity to recharge water bodies, future water availability is a challenge.

vi) Uneven distribution of the country's water resources. The geographical and temporal disparities in the availability of water resources make it costly to supply water to certain areas.

vii) Limited stakeholder participation: Without active civil society engagement, stakeholders' mobilisation, awareness and community empowerment will be slow.

viii) Inadequate and reliable financing: Funding for WRM functions is very low. This constrains the GoR's ability to protect, conserve and rationally allocate water resources to different needs.

ix) Under-developed Water Resources Database and Information System makes water resources planning, allocation and monitoring extremely difficult. The available data is scanty, archaic and scattered in various institutions. There are on-going efforts to improve systems for collection, storage, analysis and dissemination of water resources data.

x) Inadequate cooperation in the management of trans-boundary waters: Rwanda's waters are all trans-boundary but there are no internal mechanisms for trans-boundary water cooperation beyond participation in NBI and LVB frameworks.

xi) Water resources development is still low, a result of decades of little public investments. Most of the public investments in the water sector have focused on water supply infrastructure, irrigation and hydro-power development. WRM activities have received very little funds.

xii) Invasive species - The water hyacinth (*Eichhornia crassipes*) occupies some areas of the river system of Rwanda, from Mukungwa, to Nyabarongo and Kagera, from where it enters Lake Victoria. This weed poses a major threat to the Victoria and Nile waters. Efforts to control the weed in Lake Victoria will only be effective if control measures are scaled-up in the Rwandan river system.

3. GORVERNMENT OF RWANDA’S STRATEGIC VISION AND IMPLICATIONS FOR IWRM

3.1 National Development Vision and Strategic framework

Rwanda’s development process is highly dynamic, and this challenges the planning process to be flexible and adapt to the institutional environment. The over-arching framework for WRM entails:

1. **The Vision 2020:** The Vision 2020 constitutes the main development roadmap for Rwanda since 2000. It has six thematic and three cross-cutting pillars. Important elements of the Vision 2020 with implication for IWRM are:

i) Agricultural transformation: continued availability of adequate, timely and reliable precipitation is important to support agriculture and scale up area under irrigated agriculture. Reducing dependency on agriculture could reduce the pressure on water resources, given that agriculture accounts for nearly 70% of the total water use.

ii) Developing the human resources and pursue a knowledge-based economy: WRM is constrained in terms of human resource capacities and knowledge base. The strategic shift from agriculture and natural resources-dependant sectors to a knowledge economy may reduce the pressure on water resources but associated developments will increase water use in other sectors e.g. industry.

iii) Private sector-led development: a private sector-driven economic growth path implies that the Government will divest from service provision to more strategic areas like watershed rehabilitation, water resources monitoring and regulation. It will facilitate public-private partnerships in water services delivery.

iv) Infrastructure development: infrastructure developments are being made in energy, transport and communications, housing, tourism and recreation, education and health. MININFRA and districts experts indicated that water is the main destroyer of infrastructures, with up to 40% of the roads budget spent on rehabilitation and maintenance of infrastructures destroyed by water.

v) Productive high value and market oriented agriculture – agriculture intensification and commercialisation has intensified use of fertilisers and pesticides, thereby increasing pollution.

vi) Regional and international integration: Rwanda’s commitment to regional integration and international cooperation are important prerequisites to equitable and sustainable TWRM.

2. The 7-Year Government Plan (2010-2017). Under this plan, the GoR has identified 231 priority activities to transform the country. Those with particular implications for WRM are: Climate change management; Establishing a national fund for environmental protection; Rehabilitating critically degraded ecosystems and watersheds; Mainstreaming environmental conservation/ protection into all development activities; Consolidating decentralised governance and participatory service delivery; and Promoting regional integration.

3. The EDPRS (2007-2012): This has four priorities all of which underpin IWRM:

- i. *Increase economic growth* by investing in infrastructure; promoting skills development and the Service Sector; mainstreaming Private Sector development, improved land administration, enhancing sustainable land use management practices.
- ii. *Slow down population growth* by reducing infant mortality; family planning and education outreach programmes. Population growth is of particular concern for sustainable WRM;
- iii. *Tackle extreme poverty* through improved food security and targeted schemes of job creation and social protection;
- iv. *Ensure greater efficiency in poverty reduction* through better policy implementation which includes enhanced coordination among sectors and between levels of government; sharper prioritisation of activities; better targeting of services for the poor; widespread mobilisation of the Private Sector; and effective monitoring and evaluation.

Water is significant to the realisation of all the four priorities. It is a vital input in the realisation of priorities (i) and (iii); while the realisation of priority (ii), will improve WRM, as population growth is a challenge to sustainable WRM. By promoting stakeholder participation, equity and social inclusion, IWRM will contribute to attainment of priority (iv). This strategy will translate the EDPRS targets for WRM, notably sustainable WRM by building institutional capacity at national and trans-boundary levels, establishing local sub-basin committees and Local Water Associations (LWAs), starting with Nyabarongo and Muvumba Basins; and implementing IWRM&D and Master plans for surface and groundwater resources.

4. International Cooperation and Regional Integration: Rwanda is actively involved in trans-boundary cooperation frameworks with significant implications for WRM viz: LVBC, NBI, and CPGEL regions, among others. These are shaped by geographical and ecosystem endowments.

5. Policy of Decentralised Governance and Service Delivery: After establishing governance and service delivery structures at local level in the last 10 years, a new decentralisation implementation strategy has been developed, emphasising the need to promote community-driven development (CDD) approaches and strengthening local capacities for planning and accountability. This provides an opportunity to implement WRM activities at local level.

6. Evolving Water governance framework: With a comprehensive Water Law, 2008 (Law No 62/2008) which calls for water regulation in an IWRM framework, and ENR Policy 2009 and WRM Policy 2011, and a new Natural Resources Management Authority now in place, an appropriate IWRM governance framework is evolving. These instruments provide an opportunity to strengthen the resources management functions.

3.2 International framework for IWRM

This strategy is grounded in the GoR's commitment to IWRM international protocols and principles, viz:

International dialogue and declaration on sustainable water resources management: As global water crisis and related disasters intensify, dialogue around how to control, mitigate and/ or adapt to disasters, have increased to mobilise resources, provide strategic leadership and influence national policies for sustainable WRM. The most instructive for Rwanda’s WRM strategy, include:

- The *International Conference on Water and the Environment* in Dublin in 1992 in which the fundamental Principles for IWRM were shared, such as “water is an economic good”, “fresh water is a finite and vulnerable resource” and “water conservation and reuse” among others;
- *Agenda 21 Programme of Action for Sustainable Development* adopted at the 1992 UN Conference on Environment and Development in Rio De Janeiro. Agenda 21, Chapter 18 was dedicated to protection of the quality and supply of freshwater resources with emphasis on integrated approaches to the development, management and use of water resources.
- *Expert Reviews on the developments and operationalisation of IWRM*, including the 1998 Harare Expert Group meeting on Strategic Approaches to Freshwater Management, concluded that IWRM was essential for achieving efficient and equitable allocation of water resources and thus for promoting sustainable development and poverty alleviation;
- *The Millennium declaration in 2000* embodied the concept of IWRM, and emphasized the need to reverse unsustainable exploitation of water resources by developing IWRM strategies at regional, national and local levels which promote equitable access and equitable supply.
- *The 2002 Rio+10 Sustainable Development Summit in Johannesburg* made tangible steps in IWRM implementation by setting targets for development of IWRM and water efficiency plans by 2005, and develop a 20-year implementation period with regular milestones culminating in achievement of sub-sectoral targets of all freshwater programmes by 2025.

Water as a basic human right: Access to safe drinking water and living in a clean environment is now universally recognized as a human right guaranteed by the United Nations Convention on the Rights of the Child (UNCRC) and in the African Charter on the Rights and Welfare of the Child (ACRWC). The MDGs probably represent the most visible proof of global recognition and commitment to improved sanitation as a key element of poverty reduction. Rwanda has demonstrated commitment to achieving the MDG targets as reflected in the progress made thus far.

Increasing global focus on sanitation: MDG 7 raised the much ignored aspect of sanitation and its links to poverty. The global importance attached to sanitation has been illustrated by the UN General Assembly Declaration of 2008 as the International Year of Sanitation. The result was the commitment of 32 African countries to the eThekweni Declaration at the AfricanSan Conference held in South Africa in 2008. Rwanda has developed a number of policy instruments to address sanitation issues. However, access to sanitation is still low and a key source of water pollution.

More solid development partners’ coordination framework: The GoR has developed a SWAp for the ENR sector, in which IWRM activities will be coordinated. It will provide an appropriate mechanism to the GoR to ensure that planning, resource mobilisation and public investment in WRM sector strategy implementation are effectively coordinated and adequately financed.

Increasing focus on Climate change beyond the UNFCCC: Water scarcity and water-related disasters are key indicators of climate-change conditions. Mitigation and adaptation are key challenges to WRM to economies like Rwanda that are strongly dependant on rainfall. The GoR recognises the responsibilities it has to implement measures that will insulate Rwanda's economy and population against such effects, and to contribute to regional and global efforts in this regard. The GoR will implement appropriate climate change mitigation and adaptation mechanisms as part of the IWRM strategy in addition to other on-going initiatives.

Education and Public participation are important tools in enhancing stakeholder participation. Information and knowledge are critical to changing behavioural practices especially in relation to water use efficiency, pollution and conservation. Stakeholder participation fosters inclusive planning and ownership of water development programmes. Communication gaps can escalate water-related conflicts and create negative synergy.

3.3 Sectoral and cross-sector strategic priorities and plans and implications for sustainable water resources management

A number of WRM-linked sectors have included priorities supportive to IWRM. The Water Supply and Sanitation Policy and Strategy, 2010 prioritises water supply to grouped settlements (*Imidigudu*); public-private partnership (PPP) and improved efficiency. A major concern is the likely escalation of unregulated private connections, and strategic environmental assessment of planned water supply systems. PSTA II has prioritised soil and water conservation, and is being revised with a focus on climate-proofing the agricultural sector. The energy strategy recognises that the sustainability of energy projects will depend on the continued flow of water and protection of watersheds. Increased focus on long-term planning is noted, but coordination and WRM integration are missing in most e.g. the Master Plans for Irrigation, Water Supply, Transport and Urban Development.

3.3 Future outlook: Implications for Rwanda's IWRM Regime

The three strategic actions emphasised by stakeholders to address WRM challenges are:

- 1) *Conserve water* building on the investments made in catchment protection and rainwater harvesting. Galvanise these initiatives into a coherent integrated WRM programme.
- 2) *Promote efficiency*. Rehabilitate existing systems; leverage modern technologies and local innovation; and provide incentives to promote investments and behaviour change.
- 3) *Strengthen governance*, improve the policy and regulatory framework; establish a sustainable financing mechanism, improve knowledge management and enhance stakeholder participation.

4. THE STRATEGY – PRIORITIES, PROGRAMMES AND ACTIONS

*“Mitigating environmental challenges – including climate change, **water availability**, sustainable extraction of minerals and soil fertility management – should be among Africa’s top priorities”*
President Paul Kagame⁹.

4.1 Sub-sector Mission and Objectives

The Vision of the Government is... “ *Water Resources are Sustainably and rationally managed and meet Rwanda’s socioeconomic and ecological development needs*”.

The **Mission** of the Government in the Management of Water Resources is to *ensure protection, conservation, restoration and rational use of water resources to meet the country’s medium and long term socio-economic development goals.*

The **overall goal** of the Water Policy is to *ensure that Rwanda’s water resources are conserved and sustainably managed in an integrated and equitable manner to meet the country’s economic, social and ecological needs, while taking care of trans-boundary interests and international environmental obligations.*

This goal will be pursued by realising the following three main policy objectives:

- 1) the water resources of Rwanda are protected, conserved, managed and developed in an integrated and sustainable manner;
- 2) water resources of adequate quantity and quality are available for socio-economic and ecological needs of the present and future generations; and
- 3) decisions affecting water resources management are made in a coordinated manner and with the participation of all stakeholders at local, national and trans-boundary levels.

4.2 Key Priorities for the Water Resources Sector as expressed in Policy Statements

The Water Policy, 2011 identified seven broad actions for IWRM. The following Policy Statements and corresponding strategic actions will be operationalised in the next 5 years:

1. The water resources of Rwanda will be conserved, protected and managed in order to secure and enhance its availability for, and utility to, the present and future generations of Rwandans.

The strategic actions to be undertaken include:

- i) Monitor and assess water resources to identify its spatial and temporal occurrence and distribution in the country;

⁹ “Change African Mindsets on Environmental Responsibility” In *The Africa Report* No. 18; August- September 2009.

- ii) Develop a coherent Water Resources Information System and a clearing house for information on the water resources of Rwanda;
- iii) Formulate a water resources management strategy addressing, inter alia, watershed protection and provides mechanisms for the designation of special conservation and or protection zones;
- iv) Develop and promote best practices of efficient and appropriate watershed management to maximize water yields and maintain quality.
- v) Promote water conservation techniques and technologies, including rainwater harvesting, water recycling and other appropriate technologies;
- vi) Identify and institute measures to make productive use of all water resources, including thermal water for economic development, such as energy and tourism; and
- vii) Institute measures for managing water related disasters and stresses, arising from climate change, floods, droughts and demographic trends;

2. The available water resources of Rwanda will be allocated on the basis of comprehensive and integrated plans and optimum allocation principles that incorporate efficiency of use, equity of access and sustainability of the resource.

The strategic actions for this include:

- i) Develop a national water resources master plan to promote water resources conservation, ensure that abstraction conforms to the sustainable yield and to institute measures to facilitate the conjunctive use of groundwater and surface water;
- ii) Formulate principles and guidelines for the allocation of water resources;
- iii) Institute measures to develop and allocate “reserve water” to meet ecological functions and other environmental services;
- iv) Establish systems for enhancing water security by developing water storage and reservoir facilities and systems; and
- v) Develop and implement guidelines for the issuance of permits for water abstractions and wastewater discharges and for compliance monitoring and penalties for non-compliance.

3. The Government shall establish and operate a comprehensive water resources management policy, legal and institutional framework that incorporates the principle of integrated but decentralised management of water resources.

For this purpose the Government shall:

- i) Establish and operationalize an inter-ministerial coordination committee on water resources to handle water resources issues across all sectors of government; the committee will be composed by key Ministries that do have activities that involve water resources , and will be MINIRENA, MINAGRI, MININFRA, MINICOM, MIGEPROF, MINALOC, MINAFFET AND MINADEF.

- ii) Put in place and operationalise other water resources management organs provided for in the water law;
- iii) Put in place regulations and operationalise them to give effect to the water law;
- iv) Support and promote water users associations and ensure their participation in water resources protection and conservation.

4. The Government shall foster co-operation in the sustainable management and equitable utilization of shared water resources.

Strategic actions to realise this will include:

- i) Implement measures to ensure that shared water resources management is done in compliance with regional and international rules and procedures;
- ii) Within the overall water resources management strategy formulate a shared water resources management and utilization strategy;
- iii) Establish and strengthen national institutional arrangements mandated to facilitate co-operation in the management of shared water resources;

5. The Government will develop the human, technical and managerial capacity of institutions involved in water resources management at national, provincial, district and local levels so as to provide the necessary capacity for the sustainable management of the country's water resources. This addresses all three policy objectives.

Strategic actions to be undertaken include:

- i) Conduct periodic comprehensive capacity building needs assessment for the water resources management sub-sector at national, provincial, district and local levels;
- ii) Establish and implement medium- and long-term capacity building plans addressing the human resource knowledge and skills deficit, and institutional technical capacity weaknesses at national, district and local levels, with a particularly focus on integrated water resources management;
- iii) Formulate a strategy for research and studies on key emerging issues in the water resources management sector, including the impact of climate change on water resources and necessary adaptation measures;
- iv) Establish a mechanism to introduce relevant curricula and training on water resources management at school level.

6. Financing mechanisms for water resources management will be put in place to ensure availability of adequate funds on a sustained basis.

Strategic actions to realise this include:

- i) Mobilize resources from Government treasury, development partners, non-governmental organizations and the private sector for water resources management based on the SWAp approach;
- ii) Set and apply fees and charges for water abstraction and effluent discharge; and
- iii) Operationalise the water fund provided for in the water law.

7. Cross-cutting issues highlighted in Vision 2020 such as on gender equality; protection of the environment and climate change; and promotion of science and technology will be mainstreamed in programmes and activities of the water resources management sub-sector.

Strategic actions to be undertaken include:

- a. Formulate an approach to ensure that the targets of the cross cutting issues highlighted in Vision 2020 and MDGs are achieved within the water resources management sub-sector;
- b. Formulate an approach to enhance the use of ICT in water resources management.

4.3 Strategic Outcomes and Specific Activities for 2011-2015

The Rwanda IWRM Strategy seeks to achieve 7 outcomes and 39 outputs. The outputs and corresponding targets, which are summarised in Table 17, will be achieved by undertaking a number of activities at various times over the next 5 years. The major strategic actions are explained below.

1. An Effective Water Resources Governance framework that reflects the principles of IWRM is developed and operationalised by June 2015: The rationale for this strategy lies in the fact that Rwanda lacks a clear framework for managing its water resources in the context of IWRM. To achieve effective water governance, 11 strategic outputs will be realised through a range of activities, summarised in Table 17 and detailed in the log-frame (Annex 1). A key priority is to reform the WRM institutions and make the ENR SWAp effective for IWRM.

2. Cost-effective Water Resources Assessment and Monitoring System in place and operational: water resources information and capacity to utilise the information is a prerequisite for effective decision making and by implication, good governance of water resources. For Rwanda, it is particularly important in water resources allocation, and in monitoring and controlling pollution, among others. Under this strategy, five outputs will be achieved.

3. Critical Watersheds and catchments are rehabilitated and basic ecological functions restored by June 2016: As the quality and amount of water available, accessible and usable is dependent on the quality of ecosystems, restoring degraded watershed and catchments is the most important outcome of this strategy, and 4 strategic outputs will be achieved. The GoR will consolidate existing initiatives, identify critical ecosystems and invest in their rehabilitation.

4. Efficient and Equitable Water Allocation and Utilisation framework by June 2015: a framework to ensure equitable and sustainable water allocation is in place, and that such resources are utilised productively and efficiently. This will be realised through four outputs, ranging from sectoral planning, demand forecasting to promoting efficiency. They are summarised in Table 17.

5. An effective framework for Water-related disaster management, Climate change mitigation and adaptation in place and implemented by June 2013. Changes in water availability, quality and water-related disasters (drought, floods, epidemics, destructive rains, etc) are some of the key indicators of climate change. Under this outcome, 5 strategic outputs will be achieved, all relating to planning, capacity building and information generation and preparedness.

6. Basic Capacities installed and effective framework for sustained WRM Capacity Development and Knowledge Management established: Achieving sustainable IWRM requires sustained and adequate capacities. Managing multiple issues in WRM requires a robust knowledge management system that entails capacity to collect and translate data into information and knowledge for decision-making. This framework will support sustained development of relevant skills and information for WRM. Seven outputs will be achieved to realise this outcome.

7. Effective framework for managing trans-boundary or shared waters: A framework for trans-boundary water cooperation will be established. Rwanda will have capacity to negotiate with other riparian countries, plan and use its shared water resources in a balanced and harmonious way. The 7 strategic outcomes and corresponding outputs are summarised in Table 18 below.

Table 18: Summary of Outcomes, Outputs and targets

Strategic result/Outcome	Key Outputs and Targets
1: Effective Water Governance framework that reflects the principles of IWRM	<ul style="list-style-type: none"> ✓ Adequately-resourced and effective national WRM Directorate is in place and fully functional by June 2012; ✓ A Water Resources Development and Management Master plan to guide the present and future development of water resources in place and being implemented by September 2012; ✓ Water Catchment and Sub-catchment mgt plans and Committees in place and operational by 2015; ✓ Inclusive and functioning coordination mechanism (operational SWAp by June 2011) ✓ Harmonised sectoral and cross-sectoral policies and plans by June 2012 ✓ IWRM- supportive legal and regulatory framework fully operational by June 2012 ✓ Operational Public – Private partnership arrangements for WRM by 2015 ✓ <i>Community and civil society effectively participate in WRM activities:</i> ✓ Effective mechanism for adequate and sustainable financing of WRM activities: ✓ An effective communication strategy in place and implemented; ✓ An effective strategy to promote ICTs applications in WRM in place and implemented
2: Cost-effective Water Resources Assessment and Monitoring System in place and operational	<ul style="list-style-type: none"> ✓ Updated Hydrological database and Water Resources Information System ✓ Water quantity and quality status reports regularly published ✓ Water quality Standards established, communicated and enforced ✓ Strategy for assessment, exploitation and monitoring of geothermal water resources developed; ✓ Point-source pollution of all major water resources controlled;
3. Critical Watersheds and catchments are rehabilitated and basic ecological functions restored by June 2016	<ul style="list-style-type: none"> ✓ Critical Watersheds, catchments and sub-catchments are mapped and their ecological functioning analysed; Micro-catchment and catchment level management rehabilitation plans developed and implemented; ✓ Valuation of National Wetlands undertaken and a national programme for restoration, conservation and management developed and implemented; ✓ Invasive species infestation in water systems analysed, controlled and monitored
4: Efficient and Equitable Water Allocation and Utilisation framework	<ul style="list-style-type: none"> ✓ Sectoral plans for water demand and utilisation in place and integral part of sectoral planning; ✓ Catchment-based Water Allocation Master plan reflecting rights and obligations of water users developed, disseminated and in use; ✓ An incentive structure for promoting water use efficiency and conservation in place and operational; ✓ Rainwater harvesting adopted by all institutions and at least 50% of Households;
5: An effective framework for Water-related disaster management and Climate change mitigation and adaptation in place and implemented;	<ul style="list-style-type: none"> ✓ Climate change resilience and vulnerability status in key water-related sectors established and regularly updated; ✓ Early warning systems on extreme weather conditions ✓ National Water balance and water security plan in place and implemented ✓ Operational safety plans for Water ways and Water infrastructure installations; ✓ Effective National Disaster Management plan that reflects and prioritises water-related disasters in

	place and implemented;
6: Effective framework for management of shared waters (transboundary cooperation framework)	<ul style="list-style-type: none"> ✓ Trans-boundary Water Cooperation framework in place and integrated into the Country's international relations and regional integration strategies; ✓ National WRM-related policies, legal regimes and institutional framework harmonised with water governance frameworks in the Nile and Congo River-basin countries ✓ Rwanda effectively participates in the Nile, Congo, Kagera and Victoria Basin cooperation and other regional and international water management frameworks
7: Basic Capacities installed and effective framework for sustained WRM capacity development and Knowledge Management established.	<ul style="list-style-type: none"> ✓ Plan and budget for continuous WRM skills improvement and institutional capacity development; ✓ Universities and Training institutions have adequate capacity to train WRM experts and technicians; ✓ Adequate WRM expertise among local service providers ✓ Applied Research Fund in place and includes mechanisms to promote WRM research ✓ Documentation and sharing of lessons and good practices from WRM Programme ✓ WRM Information exchange programme; ✓ Functioning and effective national hydrological infrastructure network ✓ <i>Water for life</i> knowledge and skills integrated into formal and non formal education curricula

5. IMPLEMENTATION ARRANGEMENTS

This chapter describes the approaches, mechanisms, resources and institutional structures to translate the strategic outcomes and output in chapter 4 into real results.

5.1 Institutional Roles and Responsibilities

This strategy will be implemented through a complex institutional structure comprising of Government Ministries and agencies at Central and Local Government level, as well as inter-sectoral coordination structures that bring together stakeholders from public, private and civil society. The institutional roles and responsibilities are outlined here-below.

5.1.1 Policy ministries and agencies

MINIRENA will provide overall policy direction and political oversight, coordinate the preparation of the sector budget and defend it in cabinet, and lead resource mobilization and accountability. **MINELA** will also proactively engage other water-related ministries and agencies to include WRM activities in their strategies, plans and budgets.

As the Chair of the Inter-Ministerial Committee on Water Resources and subordinate organs created thereto, **MINIRENA** will ensure that water use is regulated according to set quotas and water allocation plans. It will constitute and supervise a National Water Resources Technical Working Group, and provide institutional home to the Basin and Sub-basin Management structures envisaged to be operational by year 3 (i.e. by 2013).

MINECOFIN will provide strategic guidance to the national development planning processes, and lead the resource mobilisation and allocation process. With respect to planning and resource allocation, **MINECOFIN** will assist to link the IWRM strategic outcomes with the EDPRS and higher level plans. It will facilitate resource mobilisation meetings with development partners and approve new innovative financing mechanisms for this strategy. It will ensure that key ministries with IWRM responsibilities prioritise and allocate sufficient funds to IWRM activities.

Sector Ministries and Agencies:

Active involvement of productive and social sector ministries will be a litmus test that the set framework for coordination of IWRM activities is working. Most planned activities (particularly under outcome 3) will be undertaken by these ministries/ agencies. For example, more than 90% of Outcome 3 activities will be on agricultural land, hence **MINAGRI** will play a lead role.

MININFRA has a particularly unique role since all the 5 sectors under its supervision are directly related to water resources use:

- **Water supply and sanitation** Directorate will prepare water use plans, request for abstraction and development license, and promote equitable and efficient water use (across all strategic outcomes).
- **The Energy** Directorate is implementing hydro-power development master plans, will realign the hydropower development strategy and Geo-thermal development plan to the WRMD Master plan, and submit its water requirement plans and utilisation reports, as envisaged under this strategy;
- **Housing and Urbanisation Directorate** will integrate the IWRM activities into its housing and urban development master plans, and budget for the relevant activities outlined in the strategy. This includes promotion of efficiency including rainwater harvesting, re-use and waste management.
- **The transport and construction sub-sectors** will, among others, have to plan for water use in large scale construction and monitor water-related disasters, as expected under Outcomes 3, 4 and 5. Safety and pollution control in water transport will be monitored by the Transport Department.
- **The Meteorology Service** will provide reliable and timely data on precipitation and other weather parameters for application in agriculture, infrastructure, disaster management, and water resources planning. It will provide technical support to Planners and researchers to interpret and use.

Social services and social protection institutions will develop policies, programmes and plans to ensure that safety nets and targets for gender, HIV/AIDS and extreme poverty issues, are integrated into sectoral plans and budgets. Access to adequate clean water and participation in WRM will be monitored.

5.1.2 Regulatory institutions

The main regulatory bodies with a key role in IWRM are:

- 1) **REMA** will lead in ecosystems rehabilitation, monitoring and regulation. REMA's experience in implementing ecosystem rehabilitation and protection projects will be essential in realising outcomes 3, 4 and 5. REMA is already leading the national response to Climate Change.
- 2) **RBS** is responsible for quality regulation and standards setting. It will lead the formulation and enforcement of water quality standards, including dissemination to industrial, health, food, agricultural and other sectors known to be pollutant sources. RBS will co-manage or host at least one of the nationally certified Water Quality Laboratories to be set up under this strategy.
- 3) **RURA** licenses and regulates all operations of water, energy and other utilities from prospecting to distribution. RURA will ensure that the operations of especially water and energy utilities comply with set national standards and water allocation quotas. IWRM issues will be integrated into the generation/production licensing, tariff setting and distribution regime for all utilities.
- 4) **The Building, Public Health and Hygiene Inspection Divisions** will ensure that sanitation and waste management activities at all levels comply with set standards. They will promote behaviour change and establish incentives to control pollution. These functions have to be integrated in the sectoral plans and budgets of relevant institutions, which have to document and report regularly.

5.1.3 Decentralised structures

District Local Authorities: The District Water Officers (DWOs) will be the focal points for WRM in each district, and be part of the Sub-basin technical monitoring committees. They will work with and coordinate IWRM activities in liaison with other technical units (agriculture, infrastructure, and environment, Social Affairs,).

The structures to be created will support community mobilisation, training and guidance in the process of delineating sub-basin and sub-catchments, establishing and training sub-catchment committees, and in formulating sub-catchment management plans (under outcome 1 and 3). In the implementation of CDD micro-projects, these structures will coordinate the training and guidance of beneficiary communities, assist in formulating proposals and follow-up the implementation and report on progress made. They will scale-up the interventions by integrating lessons learned into the district planning processes (DDP and *Imihigo* targets, CDF financing). A functional review of water sector decentralisation will be undertaken to establish the possibility of conflict in roles and the appropriateness of DWOs, considering their present roles in rural water supply.

Provincial Administrations will be responsible for mobilising and coordinating joint inter- and intra-basin planning and implementation of IWRM activities involving more than 2 districts. Although under-capacitated, the PA is the only sub-national level with experience and political clout to bring together district authorities within a common geographical area (which to some extent coincide with hydrological boundaries).

5.1.4 Research and training Institutions

A robust Knowledge management system will be established to ensure timely availability of reliable scientific information on water resources. NISR will be engaged to:

- ✓ review its statistical systems to integrate key water-related questions; and ensure that water data is collected, analysed, published and integrated into national monitoring processes;
- ✓ ensure that statistical design and data collection standards are incorporated into water resources assessments, statistical analysis and sampling skills and transferred to water resources staff;
- ✓ establish a long-term arrangement for technical support to WRM personnel in statistical techniques including sampling, analysis and inference on water-related statistics;
- ✓ enlist active participation of NISR in the production of the State of Water Resources Reports.

The research, training and technology development institutions will be facilitated to conduct WRM policy-relevant research. Inter-disciplinary research will be promoted to address complex cross-sectoral issues. Training institutions will be assisted, through grants and technical assistance, to train WRM technicians and other cadres. MoUs will be signed to secure their longterm commitment.

5.1.5 Non-state actors

The WRM strategy provides a platform for active involvement of non state stakeholders, whose respective roles are summarised hereunder:

1. **Donors and Development Partners** will provide financing and technical assistance support to the IWRM implementation process, building on existing arrangements, and the Donor Division of Labour developed by MINECOFIN. SIDA (the Swedish International Development Cooperation Agency), the World Bank and the African Development Bank (AfDB) have developed clear strategy for IWRM. SIDA and World Bank are already supporting trans-boundary water-related programmes. UNDP has co-steered the process of developing a SWAp for the ENR, helping to mobilise other development partners who have made commitments.
2. **Transboundary Water Cooperation frameworks:** The NBI (one of whose programmes – NELSAP - is coordinated in Kigali) and the LVBC are important regional shared waters cooperation frameworks with planned investments in Rwanda. These will be engaged to deliver on Outcome 7, and partly Outcomes 2, 3, and 4. The GoR will leverage its excellent relations with these bodies at the Summit level (East African Heads of State) and Council of Water Ministers to mobilise the needed resources and technical assistance.
3. **Civil society organisations and platforms:** CSOs will play a lead role in public education and awareness creation; advocacy for equitable water access (especially in line with MDGs 1 and 7 targets and the Johannesburg Action Plan on water and sanitation), and in implementation of micro-projects and watershed rehabilitation plans.
4. **The Media** plays a central role in awareness creation, mass mobilisation and education. Media houses/practitioners will be empowered with knowledge, skills and information, and facilitated logistically to ensure accurate and sustained mass communication of IWRM activities.
5. **The Private Sector:** The incentives for private sector involvement are already in-built in the various demand and use strategies which reflect private service provision in water supply and sanitation; technology generation and supply; water abstraction, and water treatment and use. Businesses are at the centre of resource extraction and their activities generate waste. Their innovativeness, entrepreneurship skills and self-drive will be leveraged to control pollution and address water efficiency issues by encouraging, supporting and compelling them to adopt appropriate technologies. Private sector groups - water vendors, horticultural farmers, industrialists, will be mobilised, sensitised and incentivised to promote good IWRM practices.

5.2 Formulating action plans, projects and budgets

MINELA will constitute a small technical team to formulate the action plan for year 1. A Detailed Sector Investment Plan (SIP) should then be prepared with guidance from MINECOFIN and resource mobilisation strategy. Within the limits of the Medium-term expenditure framework (MTEF), this strategy will be operationalised through detailed annual, quarterly and monthly work plans. Quarterly Action plans are important because budget releases are made on a quarterly basis and it is envisaged that the SWGs will meet on a quarterly basis.

5.3 Sector-wide coordination mechanisms

The EDPRS-linked Sector Working Groups (SWGs) are the most solid cross-sectoral forums for monitoring of sectoral plans. The SWG on WRM will be primarily responsible for coordinating the plans under the supervision of MINELA Permanent Secretary. The Rwanda Natural Resources Authority (RNRA) (or other agency as will by law be established) will identify core focal points to advocate and explain IWRM issues in other SWGs. At a different level, inter-ministerial task forces (such as on Irrigation or Resettlement) will be required to integrate IWRM issues in their planning and monitoring activities.

5.4 Cost implications

A total of US \$ 64,502,050 (RwF 48.38 billion) will be required to implement this strategy. The total estimates by programme and annual allocations are summarised in Table 18.

Table 18: Budget Estimates by Outcome/Programme and Annual Allocations 2011/12 – 2015/16

	OUTCOME DESCRIPTION	ANNUAL BUDGET ALLOCATION (US\$) ¹⁰					TOTAL BUDGET (US \$)
		2011/12	2012/13	2013/14	2014/15	2015/16	
1	Effective Water Governance framework that reflects the principles of IWRM	2,652,492.5	1,894,637.5	1,136,782.5	1,136,782.5	757,855	7,578,550
2	Cost-effective Water Resources Assessment and Monitoring System	1,241,750	1,241,750	993,400	745,050	745,050	4,967,000
3	Watersheds and catchments rehabilitated and their ecological functions effectively restored	3,494,500	4,368,125	3,494,500	3,494,500	2,620,875	17,472,500
4	Efficient and Equitable Water Allocation and Utilisation framework	1,735,750	2,603,625	1,735,750	1,301,812.5	1,301,812.5	8,678,750
5	An effective framework for Water-related disaster management and Climate change mitigation and adaptation.	2,646,600	4,411,000	3,528,800	3,528,800	3,528,800	17,644,000
6	Effective framework for management of shared waters	398,662.5	664,437.5	531,550	531,550	531,550	2,657,750
7	Basic capacities installed and effective framework for WRM Capacity Development and Knowledge Management	1,651,050	1,375,875	825,525	825,525	825,525	5,503,500
	Total Budget for the Strategic Plan	13,820,805	16,559,450	11,564,020	11,564,020	10,311,467.5	64,502,050

Source:

As indicated in the Table 18, most resources will be invested in the first 2 years, after which an average of US \$ 11 million will be required annually. The allocations in time are based on the schedule of activities, so any adjustment in the time frame (Annex 2) will result in budget reallocation. If the resources are secured, the catch 22 will be in ensuring that huge amounts (US\$ 30.4 million) amounting to 47% of the programme budget are absorbed in the first 2 years with very limited institutional capacity. At the same time, this allocation is justified by the need to fast-track capacity development for IWRM governance.

¹⁰ Note: Conversion to RwF should be based on the prevailing BNR rates at www.bnr.gov.rw

6 FINANCING AND FINANCIAL MANAGEMENT STRATEGY

6.1 Financing Arrangements

Successful IWRM implementation requires reliable, adequate and sustainable financing. Financing for this strategy is analysed from two main perspectives; the short term and long-term.

1. *What are the possible financing mechanisms for IWRM activities?*

- Sector Budget Financing (domestic/ foreign);
- Private investments (e.g. do water companies pay for abstraction?)
- Public-private partnerships
- Payments for water as an ecosystem service (e.g. commercial farmers)
- Endowment/ trust funds

2. *How will the funds be mobilized, allocated, utilized and accounted for?*

Financing mechanisms are included as a key output under Outcome 1. Part of the Capacity building interventions will be to strengthen national capacity for sustainable WRM financing.

1. **Available resources from ENR MTEF:** The starting point in resource mobilization is the already committed funding from the budget. The medium expenditure framework (MTEF) has allocated very little funds to the WRM and related sub-sectors. Hence, most funding will have to be mobilised from other sources. Table 19 indicates the financing gap after considering the MTEF commitments for the 2011/12 and 2012/13.

Table 19: Financing Gap based on Existing MTEF Commitments

	2011/12	2012/13	2013/14	2014/15	2015/16	Total
MTEF Allocation (1 US\$ = Rwf590)	5,096,836	6,477,097	-	-	-	11,573,933
Total Budget for the Strategic Plan	13,820,805	16,559,450	11,564,020	11,564,020	10,311,467.5	64,502,050
Difference	8,723,969	10,082,353				52,928,117

Source:

Note: that the MTEF commitments only includes allocations to WRM and excludes resources from other sectors and ENR sub-sectors.

2. **Leveraging resources from other sectors:** there is scope to leverage resources from ENR sub-sectors and other water-related sectors to support planned IWRM investments.
- 3.
4. **Lobbying for increased allocations from public budget:** Demonstrated absorption capacity and financial accountability, increased networking among key actors and with development partners, Parliament and MINECOFIN, will enhance prospects for increased budget allocation. In addition, having a clear strategy linking IWRM investments with economic and social outcomes envisaged under the EDPRS will increase justification for more budget allocation.

5. ***Finding innovative financing mechanisms outside the budget:*** A range of financing options will be analysed and explored in the first year of the Strategy implementation. Establishment of a Water Fund is one key option to be pursued. Non tax revenues from water licenses, fees, fines and royalties, will be well managed under the Fund. IWRM will also benefit from PPPs and existing Environmental Funds. But an operational framework has to be put in place first.
6. ***Long-term Project financing and short term interventions*** – despite the adoption of the SWAp mechanisms and move towards basket funding, some development partners are still unable to finance interventions through budget and/ or through the SWAp mechanisms. Large scale projects and short term technical assistance requests will provide a window for financing outside the budget and basket mechanisms. Nonetheless, short-term discreet projects are discouraged because of the transaction costs and limited impact.

6.2 Sector Budget Support and Joint Financing

The ENR Sector is in place, and a memorandum of understanding (MoU) has already been signed by at least 6 development partners, committing financing to the ENR basket, including WRM activities. The SWAp will improve financing through synergetic resource mobilization, collaborative and coordinated planning, implementation and reporting. With improved coordination and clarity of stakeholder roles, the financing framework will be supportive to IWRM implementation.

MINIRENA will be responsible for coordination resource mobilization, sector reporting and partnership development, supervising the RNRA. Programme resources will be allocated according to action plans and budgets and (as indicated in the Activity Schedule Annex 3).

Operational activities will be undertaken at decentralized levels, and the districts will be the accounting centre. This presents 2 key challenges: 1) the district water offices are under-developed and mostly deal with water supply and sanitation; 2) the principal structures proposed for WRM at basin, sub-basin and micro-catchment levels are unlikely to be in place until mid 2012. This calls for urgent establishment of Inter-Sectoral WRM Committees to take on this role.

7. MONITORING, EVALUATION AND LEARNING

7.1. Framework for IWRM Monitoring and Evaluation

The expectations for monitoring and reporting under this IWRM strategy entail the following reporting mechanisms:

i) Commitments and Targets under the EDPRS: Water quality and IWRM are key CPAF indicators. This shows that WRM issues are high on the Government priorities.

ii) Sector level targets and indicators: the WRM sub-sector and Water Supply and Sanitation sub-sector have targets for IWRM relating to water access, efficiency, quality, and participation.

iii) Decentralised level MandE systems: All 30 districts have targets relating to access to clean water and sanitation, soil erosion control and tree planting (catchment and watershed protection) and rain water harvesting, in their Annual performance contracts (*IMIHIGO*) and DDPs. The *Imihigo* permeate downwards to village levels and are the most politically supervised. They are reviewed on a quarterly basis. Reporting, however, needs to improve to reflect IWRM outcomes.

iv) Corporate and Business Reports of Utility Providers: EWSA (the sole or main supplier of piped water to the urban population, prepares annual corporate and business reports in which details of water produced (including raw water?), the connections made, the revenue generated, and water losses incurred, among others, are provided. EWSA also has a large database of water abstraction, production and network expansion spanning several decades. This will be a good source of information. EWSA also holds a monopoly in generation, transmission, and distribution of hydro-electric power.

v) Civil society reporting systems: Although civil society is still perceived as less transparent in their operations, the current legal framework requires them to report regularly on their activities and the districts in which they work must provide certificate of good cooperation and conduct. This compels them to work within existing development priorities and share information about their work. For CSOs working in water-related sectors, these reporting processes will provide useful catchment-level information to feed into the M & E system.

7.2 Indicators, data collection and reporting

Indicators and data are the fulcrum of the M&E system. They reflect the priorities pursued while data provides the measure. The log-frame in Annex 1 will be the main tool for monitoring the IWRM strategy implementation. But they require reliable, timely and easily comparable data, and the targets must be reviewed to reflect reality. Baselines will be established through a comprehensive review, and the log-frame targets might have to be re-set.

The main reporting mechanism is the quarterly and annual progress reports, but it will go beyond the EDPRS to include targets for the MDGs (2015), Government Plan (2017), and Vision 2020 and support the decisions of the Inter-Ministerial Committee on Water. The reporting framework will

include progress towards international IWRM commitments e.g. the Johannesburg Commitments on Water and Sanitation; the National Climate Change Adaptation Action Plan (NAPA). The reporting system is also expected to support reflections on the sector targets as a whole and provide the basis for follow-up. The main sources of data/ information will include:

- **Water resources database and information system:** MINIRENA is developing an electronic water-resources information system (WRIS) that will provide water quantity and quality data.
- **Sector Monitoring and Evaluation systems and reporting processes:** Most water-related sectors have developed M and E systems to provide data and information on sectoral plans and activities. PSTA II has a comprehensive reporting framework. Data on its Programme 1 will particularly be useful to report on IWRM Outcomes 1, 2 and 3.
- **Environmental Information System:** REMA has developed a comprehensive website on projects and other activities. Most of these relate to water resources activities in outcome 3.
- **National statistical surveys, censuses and abstracts:** the national statistical systems will support water resources data collection and cross-sectoral analyses within the existing statistical systems. For instance, agricultural statistics need to include irrigation and precipitation, while social statistics should include water access.

To effectively utilise these information sources, the performance indicators in the log-frame will be reviewed and key information sources identified. Specific follow-up roles will be assigned to particular individuals. However, the different reporting schedules and/ or formats need to be noted.

7.3 Key considerations for the IWRM M&E framework

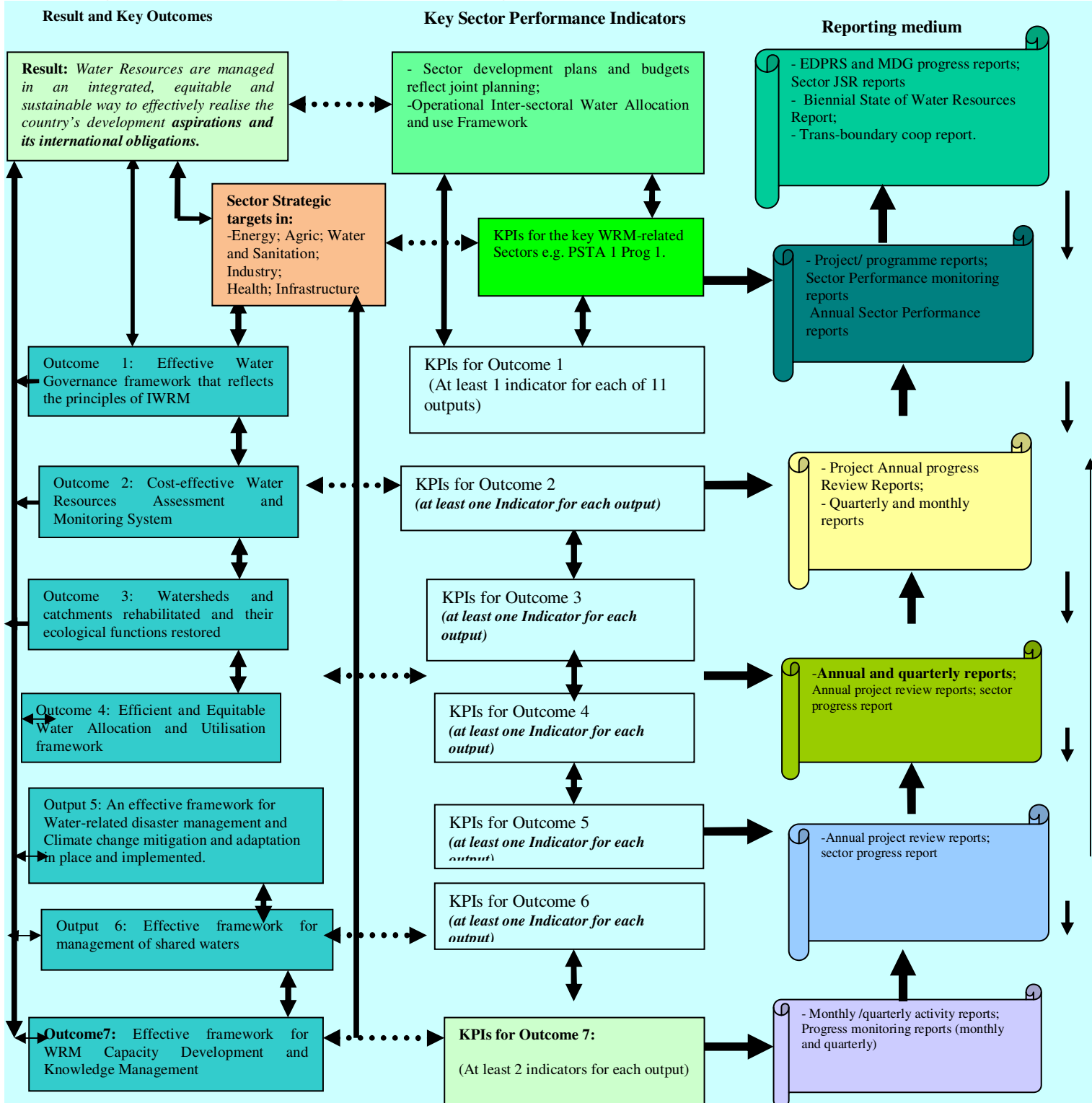
In operationalising the IWRMs M&E system, a number of considerations have to be made:

- i) **Need for flexibility and continuous update of indicators:*** In addition to reviewing progress, Joint Sector Reviews will serve as platforms for continuous reflection on the indicators being tracked, and in light of new priorities, make necessary updates. WRM stakeholders will have a responsibility to continuously review the relevance of the data and targets.
- ii) **Allow for cross-sectoral linkages to facilitate holistic reporting.*** As all strategic outcomes are inter-related, progress reporting on any activity will require reference to actions in other domains. For instance, sediment load monitoring is a measure of water quality but will likely be linked to upstream catchment protection. These aspects must be tied to get a meaningful picture.
- iii) **Utility value of the M&E reports:*** utility of the information in M&E reports is a critical indicator of the progress towards effective IWRM governance. Subsequent reporting meetings will reflect on how previous JSRs reports have informed policies, programs and other IWRM decisions.
- iv) **Participation and inclusion:*** ensure that M&E work is participatory and reporting is not left to a few staff (EDPRS Facilitators, Planners). There must be sector-wide input. In a multiple reporting framework like this, stakeholder dialogue sessions and field visits will be useful.

v) **Provide a budget for M&E and build trust:** as most activities will be undertaken in other sectors, coordination by MINIRENA will hold the key. Effective coordination will require a shared vision, mutual trust and confidence, as well as a budget.

A schematic illustration of the IWRM M&E system is presented in Figure 5.

Figure 5: Illustration of the project Monitoring and Evaluation system



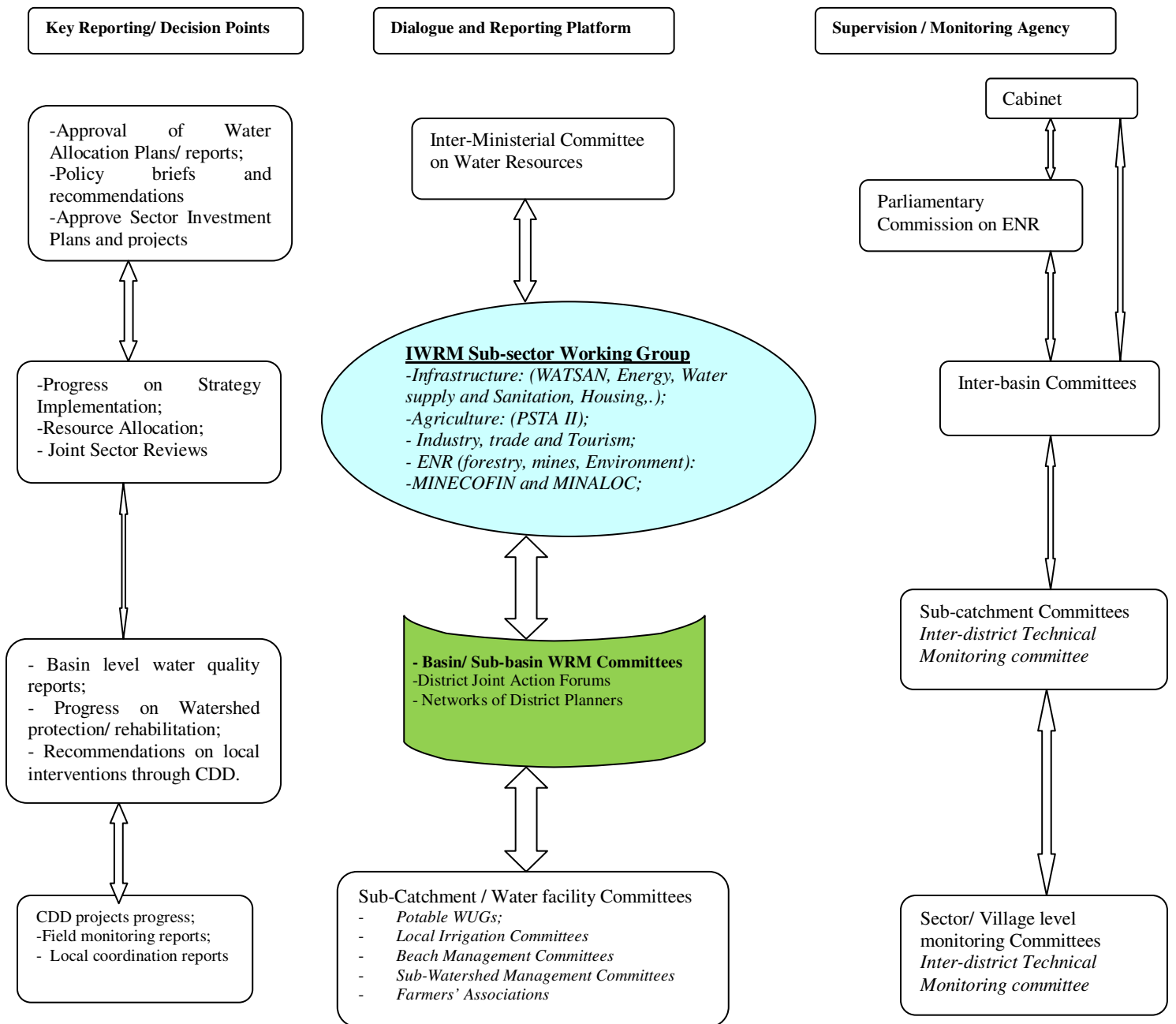
7.4 Knowledge management and communication strategy

Knowledge management is integral to an effective IWRM framework, which requires collection and storage and analysis of data often over a long time. Knowledge management will entail the collection, storage, analysis and sharing of data/information on hydrological, land, socioeconomic, infrastructural and demographic aspects of water. The challenge is that this information is held in different institutions and there is limited capacity to collect, analyse, share and use it for decision making. A first and crucial step in developing a good knowledge management system will be to establish a network of WRM information/ data producers and data users at different levels.

IWRM communication strategy: Managing water resources requires a complex yet simple communication system that can serve diverse stakeholder groups. The WRM Communication Strategy will have to resolve a number of dilemmas:

- i) ***Dealing with too many unique layers.*** A shift in WRM structure to sub-basin and sub-catchment levels suggest that detail will be important since the *One-size-fits-all* situation does not arise in diverse micro-catchment environments. The communication model has to be inclusive and sensitive to the fact that each basin, sub-basin and sub-catchment is unique, especially in view of the high bio-geophysical variations. Information must flow to and from each sub-basin unit with minimum distortion. Messages often get distorted when they are subjected to aggregation, extrapolation and different media. How to ensure that unique sub-catchment level issues are brought up to the attention of policy makers is a real challenge.
- ii) ***Managing complex issues with simple structures-*** At every scale, IWRM issues are complicated, primarily because they involve multiple geographical scales, diverse and complex socioeconomic interests and stakeholders – from individual, household, community up to regional scales. Thus, uniform guidelines might not work for the different catchments, sub-catchments and basins. Communities behave differently, perceive and embrace change at different paces. Water users and local actors will have to report on issues that they are not familiar with e.g. indicators and data. This will be a challenge to reporting and coordination at national level.
- iii) ***At community/ water use levels,*** issues will relate to the following platforms:
 - *Communication with and among local water users* – farmers managing a small irrigation system; households managing a clean water supply facility (*robine*);
 - *Communication with and among local sub-catchment monitoring committees* (or whatever structures are created in accordance with the water law).
 - *Coordination between/ among administrative structures* jointly managing a watershed or water facility.
 - *Community driven projects (CDD)* – how community micro-projects on watershed protection and water facility management are planned, implemented and the information shared.

Figure 6: Framework for Stakeholder Dialogue and Communication in IWRM



8. ASSUMPTIONS, RISKS AND RISK MANAGEMENT

8.1 Key Assumptions

A number of assumptions have been considered in the formulation of this strategy:

- ✓ The prevailing *political will is sustained* over a long time. There is a new political mandate, so stability of political programmes is assumed to be secure;
- ✓ *Stakeholders maintain interest* in IWRM issues, and are willing to work together in a sector-wide framework;
- ✓ There are sufficient incentives to inspire coordinated WRM planning and utilisation;
- ✓ The IWRM governance framework will develop the capacity to accomplish planned activities, and ensure that benefits from IWRM are shared;
- ✓ Stakeholders are willing and able to embrace change i.e. new technologies, good practices;
- ✓ Budgetary allocation for WRM sub-sector is significantly increased and innovative extra-budgetary sources are identified over the strategic plan period;
- ✓ No radical institutional restructuring is anticipated that significantly erodes the potential for WRM activities to be funded and/ or implemented.

8.2 Possible risks to the implementation and realization of target results

The main risks to successful implementation of the IWRM strategy are:

1. Reforms may disrupt partnership building and constrain the implementation process.
2. It might take long to establish basic capacity, resulting in delayed implementation process.
3. Inability to secure adequate financing;
4. Development partners could delay or renege on their financial commitments;
5. Commitment from other sectors may be difficult to secure; and
6. Exogenous factors (e.g. geo-political conflicts) could disrupt TWRM activities.

8.3 Risk Management

To address the risks identified in 8.2, a number of risk mitigation measures are proposed:

1) Securing adequate financing: Funds will be leveraged from other water-related sectors, and through political commitment, MINIRENA will ensure that WRM funding is increased and protected from financial shocks. MINIRENA will follow-up on resource commitments, and ensure timely submission of budgets and accountabilities. Additional funds will be mobilised through dialogue with Development Partners. Innovative mechanisms will be adopted to mobilise additional funds.

2) Fast-tracking capacity development to increase absorption rates of budgets: Capacity development activities will be fast-tracked to establish basic capacity to operationalise the strategy. Technical Assistance will help to gap-fill and fast-track capacity building. MINIRENA will ensure that a new WRM structure is in place and adequate and competent staff in place by June 2012.

ANNEXES

Annex 1: Log-frame

Annex 2: Time frame

Annex 3: Detailed Budget by Activity.

Annex 3A: Detailed Cost tables

Annex I: Logical Framework for the Rwanda Water Resources Management Strategy (2011-2015)

Goal: Rwanda's Water Resources are managed in an integrated, equitable and sustainable way to effectively realise its development aspirations and international obligations.

Outcome(s)	Key Output(s)	Key Performance Indicators and targets	Key Activities	Responsible/ Key Actors
1: Effective Water Governance framework that reflects the principles of IWRM developed and operationalised	1.1: Adequately-resourced and effective national WRM Institutions	<ul style="list-style-type: none"> - Quality of Water sub-sector reports; Extent to which WRM sector performance targets are realised - Extent to which skills & knowledge gaps are filled (% of HR positions filled) in central Government and district WRM offices; -Proportion of WRM budget realised 	Conduct Institutional Reform of the Water Sub-sector: Review the functional structure of WRM and other Public Agencies	MINIRENA/MIFOTRA
			Recruit adequate and appropriately skilled staff	MIFOTRA
			Review WRM functions in decentralised government structures (district organograms) and assess the appropriateness;	MINIRENA/MIN ALOC
	1.2: A Water Resources Development and Management Master plan in place and being implemented	<ul style="list-style-type: none"> - Approved WRDM Master plan document; - Evidence of WRM activities being based the master plan document 	Develop the National Water Resources Development Master plan	MINIRENA
			Organise Stakeholders' workshops on Master plan implementation	MINIRENA
			Organise roundtable meetings to mobilise resources for implementation of the Master plan;	MINIRENA/MIN ECOFIN
	1.3: Operational Water Catchment and Sub-catchment management plans;	<ul style="list-style-type: none"> - Extent to which WRM activities are based on approved catchment plans - Quality of Annual reports of Sub-catchment Committees; 	De-limit sub-basins and key catchments for purposes of water resources protection/conservation and management	MINIRENA
			Mobilise and sensitise local communities, leaders and stakeholders on catchment and sub-basin management approaches, roles and responsibilities;	MINIRENA; MINALOC; LGs
			Facilitate the establishment of Catchment & Sub-catchment committees/ Structures	MINIRENA/MIN ALOC
			Facilitate the catchment & sub-catchment planning processes	MINIRENA/MIN ALOC
			Adequate budgets and Sustainable financing arrangements for WRM including research and development;	MINECOFIN
	1.4: Effective WRM sector coordination and monitoring mechanism	<ul style="list-style-type: none"> - <i>Quality of decisions of of the Inter-Ministerial Committee on IWRM Operational SWAp;</i> -<i>Level of stakeholders' participation in WRM activities;</i> <i>Active Water sub-sector working group</i> <i>Extent to which all stakeholder groups are represented in the TWG meetings;</i> <i>Gender mainstreaming strategy</i> 	Establish & operationalise the Inter-Ministerial Committee on IWRM	MINIRENA+OP M+MINECOFIN
			Procure Technical Assistance in water sector planning and coordination	MINIRENA
			Training/skills development workshops for Technical, Planning and Finance Units of water related Ministries and Agencies;	MINIRENA
			Organise WRM Sector partnership coordination workshops/ meetings	MINIRENA
Develop and implement a gender mainstreaming strategy in WRM			MIGEPROF/GMO	
1.5: Harmonised sectoral and cross-sectoral policies and plans	<ul style="list-style-type: none"> - Extent to which sector plans & strategies are harmonised; - Quality of Joint Sector Reviews -Adequacy of funding for cross-sectoral activities¹¹ 	Review and harmonise water-related policies and plans	MINIRENA	
		Organise Policy and legislation harmonisation workshops for Policy makers and technocrats in water-related ministries, agencies and other relevant institutions	MINIRENA	
		Organise Training of SWAp coordinators, planners and WRM experts in MandE and reporting on water related issues in the EDPRS, Sector plans, projects and other	MINIRENA	

¹¹ For example most of Outcome 3 activities are to be implemented in other sectors, notably land, agriculture and environment. The extent to which resources are smoothly transferred and the activities actually implemented is a key indicator here.

Outcome(s)	Key Output(s)	Key Performance Indicators and targets	Key Activities	Responsible/ Key Actors
		-Evidence of Joint monitoring plans and actual activities;	obligations	
	1.6: Strong legal and regulatory framework to IWRM	- <i>Harmonised legislation- incidences of legal contradictions reported ; Guidelines on IWRM for different sectors;</i> - <i>% of districts with functioning IWRM bylaws.</i>	Review and harmonise water-related laws and regulations; Organise dialogue workshops with policy makers and technocrats to harmonise policy, legislative and other water governance instruments Organise IWRM sensitisation and Training workshops for water-related sector experts, planners and policy makers Conduct sensitisation and awareness raising for interest groups in water rights, roles and participation modalities in achieving WRM targets; Support Districts to develop regulations and bylaws for IWRM	MINIRENA MINIRENA MINIRENA MINIRENA MINIRENA+MINALOC
	1.7: Operational Public – Private partnership arrangements for WRM	- <i>Existence of MoU and activities on PPP in WRM;</i> - <i>Proportion of water sector funds generated from private sector;</i> - <i>Proportion of water services delivered by private sector;</i> - <i>Corporate Responsibility agenda/ strategy</i>	Organise mobilisation, sensitisation and partnership development workshops for private sector stakeholders in WRM; Develop and implement PPP strategy and implementation plan Advocacy and skills training workshops for private sector representatives in corporate social and environmental responsibility issues related to water resources (<i>innovative technologies adoption, water conservation, waste mgt...</i>); Organise study visits, exhibitions and other events to promote private sector participation and responsibility in sustainable WRM;	MINICOM MINICOM MINICOM MINIRENA/MINICOM
	1.8: Community and civil society effectively participate in WRM activities;	- <i>Level of participation of CSOs in SWG activities;</i> - <i>Proportion of community WRM projects by district;</i> - <i>Proportion of Water User Groups that have an operational fund;</i> - <i>Community and CSOs Annual Reports</i>	Review and map organisation and operations of existing Water user Groups/ Associations in all sectors; Mapping of CSOs in WRM activities and identify capacity gaps; Develop partnership strategy to promote CSOs monitoring of WRM and water services delivery activities at national and community level;	MINIRENA/MININFRA MINIRENA MINIRENA
	1.9: Effective mechanism for adequate and sustainable financing for WRM;	- An approved Water SIP; - Resource mobilisation plan in place by the 1 st Quarter of 2011/2012; - % of national budget allocated to WRM activities; - Availability of funds for WRM outside public budget; - Legal framework for water funds, including water use-related fees, fines and royalties	Develop and discuss a Water Sub-sector Investment Plan Organise Round table meetings for WRM Financing Organise Budget Advocacy and awareness raising workshops for WRM financing; Establish a National Water Fund and develop innovative mechanisms for generating and managing non-budget water revenue;	MINECOFIN/ MINIRENA MINIRENA/MINECOFIN MINECOFIN/MINIRENA MINIRENA/MINECOFIN
	1.10: An effective communication strategy in place and implemented	<i>A WRM communication strategy in place; WRM newsletter</i> - <i>WRM information regularly posted on relevant GoR websites;</i> - National Water Resources Status Reports reflecting catchment and sub-catchment issues; - No. of WRM-related Radio & TV Programmes aired annually;	Develop a <i>Public Education and Awareness plan for WRM</i> : Awareness raising and sensitisation programme; Publish a Six monthly Newsletter Prepare and publish biennial (2-yearly) National Water Resources Status report;	MINIRENA MINIRENA MINIRENA

Outcome(s)	Key Output(s)	Key Performance Indicators and targets	Key Activities	Responsible/ Key Actors
		- TWG reports		
	1.11: An effective strategy to promote ICTs applications in WRM in place and implemented	- Level of ICT applications in WRM activities	ICTs promoted in WRM activities (e.g. <i>phone sms in mobilisation and communication of disasters</i>).	MININFRA
2. Cost-effective Water Resources Assessment and Monitoring System in place and operational	2.1: Functional Hydrological Network and Water Resources Information System	<ul style="list-style-type: none"> ● Functioning hydrological stations; ● Existence of qualified staff at hydrological stations and sub-stations; ● Existence of competent personnel and equipment for WRIS; ● Regularly updated WRIS 	Inventory existing hydrological infrastructure and assess their appropriateness and functionality	MINIRENA
			Review existing Water Resources Data and Information system,	MINIRENA/RNR A
			Conduct national water resources assessment (quality and quantity);	MINIRENA
			Develop capacity of local and national IWRM institutions in water resources data collection, reporting and monitoring;	MINIRENA/RNR A
	2.2: Water balance in all watersheds established and regularly monitored	<ul style="list-style-type: none"> ● Reports with up-to-date data on water quality and quantity ● Water balance status reports for watersheds regularly published 	Determine Water balance in all watersheds & catchments	MINIRENA
			Prepare & publish Annual water quality and quantity reports.	MINIRENA
	2.3: Water quality Standards established, communicated and enforced	<ul style="list-style-type: none"> ○ Water pollution levels in different watersheds; ○ Published water quality standards; ○ Accredited/gazetted Water Quality testing and analytical laboratories; ● Reports of water quality enforcement. 	Develop and gazette National Water Quality Standards and sensitise WRM stakeholders	MINIRENA/RBS
			Establish at least two nationally accredited water quality laboratory	MINIRENA/RBS
	2.4: Strategy for assessment, exploitation and monitoring of geothermal water resources developed and implemented;	<ul style="list-style-type: none"> ● Incidences of disasters related to geothermal projects; ● Extent of conflicts over geothermal exploitation 	Conduct mapping of Hot springs and other geo-thermal water sites	MININFRA
			Develop a thermal exploration, development and conservation strategies that include social and environmental safeguards;	MININFRA
			Develop a regulation and monitoring plan for geothermal development activities	MININFRA
	2.5: Point-source pollution of all major water resources controlled	<ul style="list-style-type: none"> ● Progress of water samples towards set quality standards; ● Proportion of people in pollution hotspots with access to hygiene and sanitation; ● % Change in Hygiene behavioural practices among known pollutants; ● Proportion of waste water that is treated ● Proportion of urban solid waste that 	Formulate and enforce Pollution control guidelines for pesticides and fertiliser applications;	MINAGRI/MINIRENA
			Formulate and enforce guidelines for waste management for educational, health and other institutions;	REMA/MINEDUC
			Ensure that municipal and other solid waste management plans – including recycling and disposal - avoid pollution of surface and ground water sources;	MINIRENA; MININFRA; MINALOC
			Put in place mechanisms to ensure all waste are treated before disposal	MININFRA
Enforcement of Polluter pays principle – penalties and restorative orders for polluters of different scales;			REMA	
Promote eco-san technologies in Urban and Peri-urban areas			MININFRA	
Ensure regular environmental audits and follow-up of Environmental Management			REMA	

Outcome(s)	Key Output(s)	Key Performance Indicators and targets	Key Activities	Responsible/ Key Actors
		is collected and disposed of at designated landfills	<p>Reports for investment projects;</p> <p>Training and sensitisation for mining inspectors, artisanal miners</p> <p>Training of national and district Environmental and Public Health Inspectors in Water quality management;</p> <p>Develop a Hygiene and Sanitation sensitisation programme for fishing communities and aquaculture practitioners, communities living around water bodies, water transport operators/users, water recreation operators/users; marine security staff;</p>	<p>RNRA</p> <p>RNRA/RBS</p> <p>MINAGRI</p>
3. Watersheds and catchments rehabilitated and their ecological functions effectively restored	3.1: Critical Watersheds, catchments and sub-catchments are mapped and their ecological functioning analysed;	- Proportion of watersheds with known boundaries and physical status;	<p>Mapping of critical watersheds and catchments and establish their ecological functionality and economic productivity;</p> <p>Policy workshops to share results of watershed mapping and agree on critical watersheds and catchments for rehabilitation/ restoration</p>	<p>REMA/MINIRENA</p> <p>MINIRENA</p>
	3.2: Micro-catchment and catchment level rehabilitation and management plans developed and implemented;	<ul style="list-style-type: none"> Level of non-point pollution in major rivers (sediment load); Proportion of catchments with management plans; Proportion of degraded catchments rehabilitated Proportion of required funding secured; No. of water towers known and being monitored;	Develop and implement a plan to rehabilitate, restore, conserve, and protect critical watersheds, water catchments and other water systems	MINIRENA
			Assess the value of Rwanda's water towers and develop a national programme to conserve and sustainably them;	MINIRENA
			Monitor sediment load in major river systems;	MINIRENA/Districts
	3.3: Valuation of National Wetlands undertaken and a national programme for restoration, conservation and management developed and implemented;	<ul style="list-style-type: none"> Proportion of wetlands used on the basis of rational land allocation criteria; Proportion of Wetlands with known TEV (Total Economic Value); Proportion of wetlands restored to original ecological status 	Conduct National Wetlands Valuation, prepare policy briefs on Wetlands as water reservoirs wetlands use and organize policy dialogue on conservation	MINIRENA
			Develop and implement a national wetlands restoration and integrated conservation programme	MINIRENA
	3.4: Invasive species infestation in water systems analysed, controlled and monitored	<ul style="list-style-type: none"> Area of water bodies (Ha) that is covered by water hyacinth No. of water bodies affected by invasive species that are under continuous monitoring 	Undertake a situation analysis of invasive species infestation on water systems (with a focus on water hyacinth);	MINIRENA
			Develop and implement a Water Weed control and Monitoring Plan;	MINIRENA/REMA
4. Efficient and Equitable Water Allocation and Utilisation framework	4.1: Sectoral plans for water demand and utilisation in place and integral part of sectoral planning;	<ul style="list-style-type: none"> No. of sectors with water demand and utilisation plans 	Prepare and disseminate Guidelines (including fees) for raw water abstraction for different purposes;	
			Clarify water use rights and obligations for different users including upstream-downstream relations;	MINIRENA
			Organise national sensitisation and awareness raising programme on raw water allocation and water use regulations;	RNRA/EWASA
			Prepare & submit Sectoral Water requirement and utilisation plans	Sectoral Ministries
	4.2: Catchment-based Water Allocation Master plan reflecting rights and obligations	<ul style="list-style-type: none"> Proportion of water used according to Allocation master plan; Incidences of inter-sectoral water 	Understand water resources potentials and limitations	MINIRENA
			Develop and Implement a Water Allocation Master Plan	MINIRENA
		Prepare and publish annual water allocation and utilisation reports	RNRA/EWASA	

Outcome(s)	Key Output(s)	Key Performance Indicators and targets	Key Activities	Responsible/ Key Actors
	of water users developed, disseminated and in use;	related conflicts		
	4.3: An incentive structure for promoting water use efficiency and conservation in place and operational;	<ul style="list-style-type: none"> Water consumption rates per unit of production; % of water losses annually reported by key Water use sectors Per capita Water consumption in urban and rural areas 	Establish baselines and standards for water use efficiency in various sectors Develop and implement a package of incentives for promoting water utilisation efficiency; Ensure proper Operation and Maintenance procedures/plans and step inspection of water supply systems to reduce water losses; Review water pricing mechanisms to increase incentives for efficient service water delivery;	MINIRENA MINIRENA/ Sector Ministries MININFRA MININFRA
	4.4 Rainwater harvesting promoted and adopted	<ul style="list-style-type: none"> Proportion of domestic and institutional water needs met from rainwater harvesting. Proportion of Households and institutions which have rainwater harvesting facilities; Proportion of total water needs for production met from rainwater harvesting. 	Undertake rain water harvesting promotion activities for all households, institutions and production activities ; Develop guidelines and regulations for Rainwater harvesting, including recommendations on appropriate technologies Identify and train local technicians and artisans for rolling out the rain Organise mobilisation and sensitisation and demonstration activities for rainwater harvesting in all districts	MININFRA/MINIRENA MININFRA MININFRA MININFRA, INALOC,
	4.5 A framework for integrating gender and social vulnerability issues into water resources development and management is developed and implemented	<ul style="list-style-type: none"> Proportion of vulnerable people with access to adequate clean water; Proportion of women actively involved in water management activities; 	Provide incentives to increase access to water and sanitation by socially vulnerable groups i.e. poor, people living with HIV/AIDS; Put in place incentives to ensure that girls and women have adequate access to water and sanitation in schools, markets, health and other public facilities Train Women farmers in appropriate smallholder irrigation and water management technologies; Equip Water User Groups with skills and provide them guides and other tools in gender mainstreaming;	MININFRA MINEDUC MINAGRI MINAGRI/MINIRENA/MININFRA
5. An effective framework for Water-related disaster management and Climate change mitigation and adaptation in place and implemented.	5.1: Climate change resilience and vulnerability status in key sectors related to water resources established, regularly updated and used to inform WRM policy and planning processes;	<ul style="list-style-type: none"> Level of risk related to climate change in major water-related sectors; Level of awareness of climate change risks and adaptation No. of water-related sectors with functional Early Warning System 	Conduct studies on climate change resilience and vulnerability status and trends in key sectors related to water resources;	REMA
			Support Ministries and Agencies to integrate climate change information into sector planning processes ¹²	REMA, MINIRENA
			Develop a catchment-based National sensitisation programme for climate change awareness and adaptation	ISRA, RADA, MINAGRI
			Develop and promote drought-resistant crop and pasture varieties	MINAGRI
	5.2: National Water balance and water security plan in place and implemented		Establish a national water security plan, and establish a water reserve;	MINIRENA
			Develop operational guides and train farmers and communities on water storage and security;	MINAGRI/MINIRENA
	5.3: Operational safety plans for Water ways and Water infrastructure installations;		Develop a safety monitoring strategy for water infrastructure and integrate it into national infrastructure development plans and Disaster Management Plans	MININFRA
Review Infrastructure design policies and include construction of Storm water collection channels and reservoirs for all major infrastructures (roads, irrigation schemes, radical			DISASTER MINISTRY;	

¹² Epidemiological surveillance, food security, flood and drainage hazard management; irrigation and hydropower monitoring systems

Outcome(s)	Key Output(s)	Key Performance Indicators and targets	Key Activities	Responsible/ Key Actors	
	5.4: Effective National Disaster Management plan that reflects and prioritises water-related disasters in place and implemented;	- Incidences of water-related disasters	weather monitoring systems	terracing);	MINIRENA
			Map potential risks and develop prevention of water-based wildlife attacks (hippos, crocodiles)	REMA/RDB/National Parks	
			Assess the level of national disaster preparedness and develop an National Disaster Management Plan	Disaster Ministry	
			Strengthen capacity of national and decentralised institutions, including civil society, for Disaster prediction and response, with emphasis on water disasters	Disaster Ministry	
6. Effective framework for management of shared waters	6.1: Trans-boundary Water Cooperation framework in place and integrated into the Country's international relations and regional integration strategies;	-Incidences of trans-boundary water-related conflicts - Level of benefits (perceived and real) arising from Transboundary Cooperation Programmes;	Prepare and discuss position papers and policy briefs on Rwanda's position and programmes on shared waters	MINIRENA	
			Develop a National Water Cooperation Framework	MINIRENA	
			Establish a national Inter-sectoral Expert Committee for Joint Monitoring of TWRM	MINIRENA	
			Organise training and sensitisation workshops for Rwanda Diplomats and staff of Regional cooperation and Foreign Affairs Ministries	MINAFFET	
			Develop a national guide on shared waters for Rwandan Diplomatic offices, Foreign and Regional Cooperation Ministries /Agencies	MINAFFET	
			Publish and disseminate simplified versions of the International Fresh Water Agreements and Protocols to which Rwanda is signatory	MINIRENA	
	6.2: National policies, legislation and institutional arrangements harmonised with those of other riparian countries in the Congo and Nile River Basins;	- Incidences of transboundary water-related conflicts - No. of Harmonized laws and policies;	Commission studies to review legislation and policy instruments for Rwanda and other countries in the NBI, LVBC and CPEGL zones;	MINIRENA	
			Organise Stakeholder dialogue sessions on harmonization process	MINIRENA	
			Study visits for Technical staff and Political leaders to other countries to study best practices on trans-boundary WRM;	MINIRENA	
			Consolidate and simplify Policy and legislative instruments for National Trans-boundary Water Governance	MINIRENA	
	6.3: Rwanda effectively participates in the Nile, Congo, Kagera and Victoria Basin cooperation and management frameworks	- Level of perceived benefits from transboundary Water Cooperation - No. of transboundary micro-projects implemented.	Organise training and skills development programmes in International Water law, international negotiations and communication ¹³	MINIRENA	
			Participate in regional WRM meetings and activities	MINIRENA	
			Rwanda researchers mobilised to participate in VicRes Programmes under the IUCEA	Ministry of Sc and Tech	
			Organise regular dialogue engagements with regional basin-wide Cooperation bodies, especially those hosted in Rwanda	MINIRENA	
			Organise Regional and International IWRM events on shared waters	MINIRENA	
			Training and sensitisation of relevant border district and community leaders in International Water Cooperation and Joint Monitoring	MINIRENA	
			Develop Pilot collaborative community micro-projects for Trans-boundary WRM (Akanyaru, Muvumba, Ruzizi and Kagera);	MINIRENA	
			Consolidate and Scale up national programmes for protection of international waters in line with International Law;	MINIRENA/RNR A	
	7. Effective	7.1: Plan and budget for	- extent to which sector performance	Conduct Human resources and other capacity development needs in the WRM and	HIDA/MSCBS/M

¹³ Targeting experts in Ministries responsible for Environment, Water, fisheries, agriculture, Local Government, Immigration, Trade, Internal security, Disaster Management, Higher Education, Regional cooperation

Outcome(s)	Key Output(s)	Key Performance Indicators and targets	Key Activities	Responsible/ Key Actors
framework for WRM Capacity Development and Knowledge Management	continuous WRM skills improvement and institutional capacity development;	targets are reached; -Proportion of sector budget set aside for capacity building; - Extent of skills needs realised	related domains across all relevant sectors Strengthen the analytical and modelling capacity of MINELA and other WRM agencies;	INIRENA MINIRENA/MIN INFRA
	7.2: Universities and Training institutions have adequate capacity to train WRM experts, technicians and researchers;	- No. of WRM experts and technicians graduating annually; - No. of Researchers in Rwandan Universities and Research institutes participating in IWRM research programmes	Provide Technical Assistance to selected national Universities and institutions to review curriculum and Develop relevant skills development programmes for WRM researchers, technical experts and technicians Partnership arrangements in WRM training, policy analysis and other services	MINEDUC MINIRENA/MIN EDUC
	7.3: Adequate WRM expertise among local service providers	-Proportion of Water User Groups that have access to qualified technicians;	Develop and implement a capacity building plan for local WRM service providers	MINIRENA
	7.4: Applied Research Fund in place and includes mechanisms to promote WRM research	- No. of water-related research work published in/on Rwanda; - Proportion of National Research Funds set aside for IWRM research	Strategy for promoting research, learning and knowledge management	MINIRENA/MIN EDUC/ Sc and Tech Ministry
	7..5: Documentation and sharing of lessons and good practices from WRM Programme	- Existence of a knowledge hub and protocols for information sharing;	Document and share lessons from the ecosystems rehabilitation and water quality improvement programmes	REMA/MINIRE NA
			Document and disseminate lessons on adoption and impact of innovative water efficiency technologies (rainwater harvesting, waste water recycling and reuse) demos; develop plan for cost-effective scale-up;	MINIRENA
	7.6: WRM Information exchange programme;	Functional partnerships with Centres of Excellence in WRM in/outside region;	Develop a regional and International Knowledge and Information exchange programme for WRM institutions	MINIRENA
	7.7 <i>Water for life</i> knowledge and skills integrated into formal and non formal education curricula	- % of primary and secondary school children with basic knowledge on water resources management; - % schools with demonstration activities on water education - No. of musical or cultural events annually staged on water management	Review school curricula and integrate IWRM themes	
			Train school teachers and instructors in <i>Water for life</i> education	
			Support cultural and non formal education institutions to develop messages, songs and drama activities on IWRM	
		Mobilise and sensitise local authorities, civil society and local communities on public water education and awareness	MINIRENA/Ministry of culture.	

Annex 2: Time frame for the Implementation of the IWRM Strategic Plan 2011/12 – 2015/16

Key Output(s)	Key Activities	Time frame					Responsible/ Lead Agency
		2011/12	2012/13	2013/14	2014/15	2015/16	
Outcome 1: Effective Water Governance framework that reflects the principles of IWRM developed and operationalised							
1.1: Adequately-resourced and effective national WRM Directorate	1.1.1: Conduct Institutional Reform of the Water Sub-sector: Review the functional structure of WRM and other Public Agencies	X					MINIRENA/MIFOTRA
	1.1.2: Recruit adequate and appropriately skilled staff	X					MIFOTRA
	1.1.3: Review WRM functions in decentralised government structures (district organograms) and assess the appropriateness;	X					MINIRENA/MINALOC
1.2: A Water Resources Development and Management Master plan in place and being implemented	1.2.1: Develop the National Water Resources Development Master plan	X					MINELA
	1.2.2: Organise Stakeholders' workshops on Master plan implementation	X					MINELA
	1.2.3: Organise roundtable meetings to mobilise resources for implementation of the Master plan;	X	X				MINELA/MINECOFIN
1.3: Operational Water Catchment and Sub-catchment management plans;	1.3.1: De-limit sub-basins and key catchments for purposes of water resources protection/conservation and management		X	X	X	X	MINIRENA
	1.3.2: Mobilise and sensitise local communities, leaders and stakeholders on catchment and sub-basin management approaches, roles and responsibilities;	X	X	X	X	X	MINIRENA; MINALOC; LGs
	1.3.3: Facilitate the establishment of Catchment & Sub-catchment committees/ Structures	X					MINECOFIN
	1.3.4: Facilitate the catchment & sub-catchment planning processes						
	1.3.5: Adequate budgets and Sustainable financing arrangements for WRM including research and development;						
1.4: Inclusive and effective WRM sub-sector coordination and monitoring mechanism	1.4.1: Establish & operationalise the Inter-Ministerial Committee on IWRM	X	X	X	X	X	MINIRENA
	1.4.2: Procure Technical Assistance in water sector planning and coordination	X	X	X	X	X	MINIRENA
	1.4.3: Training/skills development workshops for Technical, Planning and Finance Units of water related Ministries and Agencies;	X					MINIRENA
	1.4.4: Organise WRM Sector partnership coordination workshops/ meetings	X	X	X	X	X	MINIRENA
	1.4.5: Develop and implement a gender mainstreaming strategy in WRM		X	X	X		MIGEPROF
1.5: Harmonised sectoral and cross-sectoral policies and plans	1.5.1: Review and harmonise water-related policies and plans	X	X				MINIRENA
	1.5.2: Organise Policy and legislation harmonisation workshops for Policy makers and technocrats in water-related ministries, agencies and other relevant institutions	X	X				MINIRENA
	1.5.3: Training of SWAp coordinators, planners and WRM experts in MandE and reporting on water related issues in the EDPRS, Sector plans, projects and other obligations	X	X	X	X	X	MINIRENA
1.6: Legal and regulatory framework supportive to IWRM	1.6.1: Review and harmonise water-related laws and regulations;	X					MINIRENA
	1.6.2: Organise dialogue workshops with policy makers and technocrats to harmonise policy, legislative and other water governance instruments	X	X				MINIRENA
	1.6.3: Organise IWRM sensitisation and Training workshops for water-related sector experts, planners and policy makers	X	X				MINIRENA
	1.6.4: Conduct sensitisation and awareness raising for interest groups in water rights, roles and participation modalities in achieving WRM targets;	X	X	X	X	X	MINIRENA

	1.6.5: Support Districts to develop regulations and bylaws for IWRM		X	X			
1.7: Operational Public – Private partnership arrangements for WRM	1.7.1: Organise mobilisation, sensitisation and partnership development workshops for private sector stakeholders in WRM;		X	X	X	X	MINICOM
	1.7.2: Develop and implement PPP strategy and implementation plan		X	X	X	X	MINICOM
	1.7.3: Advocacy and skills training workshops for private sector representatives in corporate social and environmental responsibility issues related to water resources (<i>innovative technologies adoption, water conservation, waste mgt...</i>);		X	X	X	X	MINICOM
	1.7.4: Organise study visits, exhibitions and other events to promote private sector participation and responsibility in sustainable WRM;			X	X	X	MINIRENA/MINICOM
1.8: Community and civil society effectively participate in WRM activities;	1.8.1: Review and map organisation and operations of existing Water user Groups/ Associations in all sectors;	X					MINIRENA/MININFRA
	1.8.2: Mapping of CSOs in WRM activities and identify capacity gaps;	X					MINIRENA
	1.8.3: Develop partnership strategy to promote CSOs monitoring of WRM and water services delivery activities at national and community level;	X	X				MINIRENA
1.9: Effective mechanism for adequate and sustainable financing for WRM;	1.9.1: Develop and discuss a Water Sub-sector Investment Plan	X	X				MINECOFIN/ MINIRENA
	1.9.2: Organise Round table meetings for WRM Financing						
	1.9.3: Organise Budget Advocacy and awareness raising workshops for WRM financing;	X	X	X	X	X	MINECOFIN
	1.9.4: Establish a National Water Fund and develop innovative mechanisms for generating and managing non-budget water revenue;	X	X	X	X		MINIRENA/MINECOFIN
1.10: An effective communication strategy in place and implemented	1.10.1: Develop a <i>Public Education and Awareness plan for WRM</i> : Awareness raising and sensitisation programme;	X	X	X		X	MINIRENA
	1.10.2: Publish a Six monthly Newsletter			X	X	X	MINIRENA
	1.10.3: Prepare and publish biennial (2-yearly) National Water Resources Status report;		X		X		MINIRENA
1.11: An effective strategy to promote ICTs applications in WRM in place and implemented	1.11.1: Use of ICTs promoted in WRM activities (e.g. <i>phone sms in mobilisation and communication of disasters</i>)	X	X	X	X	X	MININFRA
2. Cost-effective Water Resources Assessment and Monitoring System in place and operational							
2.1: Updated Hydrological database and Water Resources Information System	2.1.1: Inventory existing hydrological infrastructure and assess their appropriateness and functionality	X					MINIRENA
	2.1.2: Review existing Water Resources Data and Information system,	X	X	X			MINIRENA
	2.1.3: Conduct national water resources assessment (quality and quantity);						
	2.1.4: Develop capacity of local and national IWRM institutions in water resources data collection, reporting and monitoring;	X	X	X	X	X	MINIRENA
2.2: Water balance in all watersheds established and regularly monitored	2.2.1: Determine Water balance in all watersheds & catchments						
	2.2.2: Prepare & publish Annual water quality and quantity reports.	X	X	X	X	X	MINIRENA
2.3: Water quality Standards established, communicated and	2.3.1: Develop and gazette National Water Quality Standards and sensitise WRM stakeholders	X					MINIRENA/RBS

enforced	2.3.2: Establish at least two nationally accredited water quality laboratory		X	X	X	X	MINIRENA/RBS
2.4: Strategy for assessment, exploitation and monitoring of geothermal water resources developed and implemented;	2.4.1: Conduct mapping of Hot springs and other geo-thermal water sites		X	X			MININFRA
	2.4.2: Develop a thermal exploration, development and conservation strategies that include social and environmental safeguards;			X	X		MININFRA
	2.4.3: Develop a regulation and monitoring plan for geothermal development activities		X				MININFRA
2.5: Point-source pollution of all major water resources controlled	2.5.1: Formulate and enforce Pollution control guidelines for pesticides and fertilizer applications;	X	X	X	X	X	MINAGRI/MINIRENA
	2.5.1: Formulate and enforce guidelines for waste management for educational, health and other institutions;	X	X				REMA/MINEDUC
	2.5.2: Ensure that municipal and other solid waste management plans – including recycling and disposal - avoid pollution of surface and ground water sources;			X	X	X	MINIRENA/MININFRA;
	2.5.3: Put in place Mechanisms to ensure all waste are treated before disposal	X	X	X			MININFRA
	2.5.4: Enforce Polluter Pays principle in WRM (penalties and restorative orders for polluters of different scales;		X	X	X	X	REMA
	2.5.5: Promote eco-san technologies in Urban and Peri-urban areas			X	X	X	MININFRA
	2.5.6: Ensure regular environmental audits and follow-up of Environmental Management Reports for investment projects;	X	X	x	X	X	REMA
	2.5.7: Training and sensitisation for mining inspectors, artisanal miners		X	X	X	X	OGMR
	2.5.8: Training of national and District Environmental and Public Health Inspectors in Water quality management;		X	X	X	X	MINIRENA/RBS
2.5.9: Develop a Hygiene and sanitation sensitisation programme for fishing communities and aquaculture practitioners, communities living around water bodies, water transport operators/users, water recreation operators/users; marine security staff;	X	X				MINAGRI	
Outcome 3. Watersheds and catchments rehabilitated and their ecological functions effectively restored							
3.1: Critical Watersheds, catchments and sub-catchments are mapped and their ecological functioning analysed;	3.1.1: Mapping of critical watersheds and catchments and establish their ecological functionality and economic productivity;	X	X				REMA/MINIRENA
	3.1.2: Policy workshops to share results of watershed mapping and agree on critical watersheds and catchments for rehabilitation/ restoration		X				MINIRENA
3.2: Micro-catchment and catchment level management rehabilitation and mgt plans developed and implemented;	3.2.1: Develop and implement a plan to rehabilitate, restore, conserve, and protect critical watersheds, water catchments and other water systems		X				MINIRENA
	Assess the value of Rwanda's water towers and develop a national programme to conserve and sustainably them;		X				MINIRENA
	3.2.3: Monitor sediment load in major river systems;	X	X	X	X	X	MINIRENA/Districts
3.3: Valuation of National Wetlands undertaken, and a national programme for restoration, conservation and management developed and implemented;	3.3.1: Conduct National Wetlands Valuation, prepare policy briefs on Wetlands as water reservoirs wetlands use and organize policy dialogue on conservation	X	X				MINIRENA
	3.3.2: Develop and implement a national wetlands restoration and integrated conservation programme	X	X	X	X	X	MINIRENA
3.4: Invasive species infestation in water systems analysed, controlled and monitored	3.4.1: Undertake a situation analysis of invasive species infestation on water systems (with a focus on water hyacinth);	X					MINIRENA
	3.4.2: Develop and implement a Water Weed control and Monitoring Plan;		X	X	X	X	MINIRENA/REMA
4. Efficient and Equitable Water Allocation and Utilisation framework							

4.1: Sectoral plans for water demand and utilisation in place and integral part of sectoral planning;	4.1.1: Prepare and disseminate Guidelines (including fees) for raw water abstraction for different purposes;						MINIRENA
	4.1.2: Clarify water use rights and obligations for different users including upstream-downstream relations;	X	X				MINIRENA
	4.1.3: Organise national sensitisation and awareness raising programme on raw water allocation and water use regulations;	X	X	X	X	X	MINIRENA
	4.1.4: Prepare & submit Sectoral Water requirement and utilisation plans	X	X	X	X	X	Water user ministries
4.2: Catchment-based Water Allocation Master plan reflecting rights and obligations of water users developed, disseminated and in use;	4.2.1: Understand water resources potentials and limitations	X	X				MINIRENA
	4.2.2: Develop and Implement a Water Allocation Master Plan	X	X	X	X	X	MINIRENA
	4.2.3: Prepare and publish annual water allocation and utilisation reports		X	X	X	X	MINIRENA
4.3: An incentive structure for promoting water use efficiency and conservation in place and operational;	4.3.1: Establish baselines and standards for water use efficiency in various sectors	X	X				MINIRENA
	4.3.2: Develop and implement a package of incentives for promoting water utilisation efficiency;	X	X	X	X	X	MININFRA
	4.3.3: Ensure proper Operation and Maintenance procedures/plans and step inspection of water supply systems to reduce water losses;			X	X	X	MININFRA
	4.3.4: Review water pricing mechanisms to increase incentives for efficient service water delivery;		X	X	X	X	MININFRA
4.4 Rainwater harvesting promoted and adopted	4.4.1: Undertake rain water harvesting promotion activities for all households, institutions and production activities ;	X					
	4.4.2: Develop guidelines and regulations for Rainwater harvesting, including recommendations on appropriate technologies	X	X	X			
	4.4.3: Identify and train local technicians and artisans for rolling out the rain	X	X				
	4.4.4: Organise mobilisation, sensitisation and demonstration activities for rainwater harvesting in all districts		X	X	X	X	MININFRA/LGs,
4.5 A framework for integrating gender and social vulnerability issues into water resources development and management is developed and implemented	4.5.1: Provide incentives to increase access to water and sanitation by socially vulnerable groups i.e. poor, people living with HIV/AIDS;		X	X	X	X	
	4.5.2: Put in place incentives to ensure that girls and women have adequate access to water and sanitation in schools, markets, health and other public facilities	X	X				
	4.5.3: Organise training for Women farmers in appropriate smallholder irrigation and water management technologies;		X	X	X	X	MINAGRI/RADA
5. An effective framework for Water-related disaster management and Climate change mitigation and adaptation in place and implemented.							
5.1: Climate change resilience and vulnerability status in key sectors related to water resources established, regularly updated and used to inform policy and planning;	5.1.1: Conduct studies on climate change resilience and vulnerability status and trends in key sectors related to water resources;	X	X				REMA
	5.1.2: Support Ministries and Agencies to integrate climate change information into sector planning processes		X	X	X	X	REMA, MINIRENA
	5.1.3: Develop a catchment-based National sensitisation programme for climate change awareness and adaptation		X				REMA
	5.1.4: Develop and promote drought-resistant crop and pasture varieties		X	X	X	X	MINAGRI
5.2: National Water balance and	5.2.1: Establish a national water security plan, and establish a water reserve;		X	X	X	X	MINIRENA

water security plan in place and implemented	5.2.2: Develop Operational Guides; train farmers/communities and other water users on water storage and security;	X	X	X	X	X	MINAGRI
5.3: Operational safety plans for Water ways and Water infrastructure installations;	5.3.1.: Develop a safety monitoring strategy for water infrastructure and integrate it into national infrastructure development plans and Disaster Management Plans				X		MININFRA
	5.3.2: Review Infrastructure design policies and include construction of Storm water collection channels and reservoirs for all major infrastructures (roads, irrigation schemes, radical terraces);		X	X	X		DISASTER MINISTRY; MINIRENA
	5.3.3: Map potential risks and develop prevention of water-based wildlife attacks (hippos, crocodiles)						
5.4: Effective National Disaster Management plan that reflects and prioritises water-related disasters in place and implemented;	5.4.1: Assess the level of national preparedness for Water-related Disasters; Develop a National Water Disaster Management Plan	X	X				REMA/RDB/National Parks
	5.4.2: Strengthen capacity of national and decentralised institutions (including CSOs) for Disaster prediction and response, with emphasis on water-related disasters			X	X	X	Disaster Ministry
6. Effective framework for management of shared waters							
6.1: Trans-boundary Water Cooperation framework in place and integrated into the Country's international relations and regional integration strategies;	6.1.1: Prepare and discuss position papers and policy briefs on Rwanda's position and programmes on shared waters	X	X				MINIRENA
	6.1.2: Develop a National Water Cooperation Framework	X	X				MINIRENA
	6.1.3: Establish a national Inter-sectoral Expert Committee for Joint Monitoring of TWRM		X				MINIRENA
	6.1.4: Organise training and sensitisation workshops for Rwanda Diplomats and staff of Regional cooperation and Foreign Affairs Ministries		X	X	X	X	MINAFFET
	6.1.5: Develop a national guide on shared waters for Rwandan Diplomatic offices, Foreign and Regional Cooperation Ministries /Agencies		X	X			MINAFFET
	6.1.6: Publish and disseminate simplified versions of the International Fresh Water Agreements and Protocols to which Rwanda is signatory		X	X			MINIRENA
6.2: National policies, legislation and institutional arrangements harmonised with those of other riparian countries in the Congo and Nile River Basins;	6.2.1: Commission studies to review legislation and policy instruments for Rwanda and other countries in the NBI, LVBC and CPEGL zones;	X	X				MINIRENA
	6.2.2: Organise Stakeholder dialogue sessions on harmonization process		X	X			MINIRENA
	6.2.3: Study visits for Technical staff and Political leaders to other countries to study best practices on trans-boundary WRM;		X	X	X	X	MINIRENA
	6.2.4: Consolidate and simplify Policy and legislative instruments for National Trans-boundary Water Governance		X	X	X	X	MINIRENA
6.3: Rwanda effectively participates in the Nile, Congo, Kagera and Victoria Basin cooperation and management frameworks	6.3.1: Organise training and skills development programmes in International Water law, international negotiations and communication ¹⁴	X	X	X	X	X	MINIRENA
	6.3.2: Participate in regional WRM meetings and activities	X	X	X	X	X	MINIRENA
	6.3.3: Rwanda researchers mobilised to participate in VicRes Programmes under the IUCEA		X	X	X	X	Min. of Sc and Tech
	6.3.4: Organise regular dialogue engagements with regional basin-wide Cooperation bodies, especially those hosted in Rwanda		X	X	X	X	MINIRENA
	6.3.5: Organise Regional and International IWRM events on shared waters			X	X	X	MINIRENA

¹⁴ Targeting experts in Ministries responsible for Environment, Water, fisheries, agriculture, Local Government, Immigration, Trade, Internal security, Disaster Management, Higher Education, Regional cooperation

	6.3.6: Training and sensitisation of relevant border district and community leaders in International Water Cooperation and Joint Monitoring			X	X	X	MINIRENA
	6.3.7: Develop Pilot collaborative community micro-projects for Trans-boundary WRM (<i>Akanyaru, Muvumba, Ruzizi and Kagera</i>);		X	X	X	X	MINIRENA
	6.3.8: Consolidate and Scale up national programmes for protection of international waters in line with International Law;			X	X	X	MINIRENA
7. Effective framework for WRM Capacity Development and Knowledge Management							
7.1: Plan and budget for continuous WRM skills improvement and institutional capacity development;	7.1.1: Conduct Human resources and other capacity development needs in the WRM and related domains across all relevant sectors	X					MINIRENA
	Strengthen the analytical and modelling capacity of MINELA and other WRM agencies;	X	X	X	X	X	MINIRENA
7.2: Universities and Training institutions have adequate capacity to train WRM experts, technicians and researchers;	7.2.1: Provide Technical Assistance to selected national Universities and institutions to review curriculum and Develop relevant skills development programmes for WRM researchers, technical experts and technicians	X	X				MINEDUC
	7.2.2: Partnership arrangements in WRM training, policy analysis and other services	X	X				MINEDUC
7.3: Adequate WRM expertise among local service providers	7.3.1: Provide capacity development support to local WRM service providers		X	X	X	X	MINIRENA
7.4: Applied Research Fund in place and includes mechanisms to promote WRM research	7.4.1: Develop a Strategy for promoting research, learning and knowledge management	X	X				Ministry of Sc and Technology
7.5: Documentation and sharing of lessons and good practices from WRM Programme	7.5.1: Document and share lessons from the ecosystems rehabilitation and water quality improvement programmes	X	X				REMA/MINIRENA
	7.5.2: Document and disseminate lessons on adoption and impact of innovative water efficiency technologies (rainwater harvesting, waste water recycling and reuse) demos; develop plan for cost-effective scale-up;		X	X	X	X	MINIRENA
7.6: WRM Information exchange programme;	7.6.1: Develop a regional and International Knowledge and Information exchange programme for WRM institutions	X	X				MINIRENA
7.7 <i>Water for life</i> knowledge and skills integrated into formal and non formal education curricula	7.7.1: Review school curricula and integrate IWRM themes			X	X		MINIRENA
	7.7.2: Train school teachers and instructors in <i>Water for life</i> education			X	X	X	MINIRENA
	7.7.3: Support cultural and non formal education institutions to develop messages, songs and drama activities on IWRM		X	X	X	X	MINIRENA
	7.7.4: Mobilise and sensitise local authorities, civil society and local communities on public water education and awareness		X	X	X	X	MINIRENA+Districts

Annex 3: Budget by Output/ Major Activity and Outcome

Outcome(s)	Key Output(s)	Output total (USD)
1: Effective Water Governance framework that reflects the principles of IWRM developed and operationalised	1.1: Adequately-resourced and effective national WRM Directorate	965,800
	1.2: A Water Resources Development and Management Master plan in place and being implemented	1,117,000
	1.3: Operational Water Catchment and Sub-catchment management plans;	1,270,000
	1.4: Inclusive and effective WRM sub-sector coordination and monitoring mechanism	1,194,750
	1.5: Harmonised sectoral and cross-sectoral policies and plans	869,000
	1.6: Legal and regulatory framework supportive to IWRM	389,000
	1.7: Operational Public – Private partnership arrangements for WRM	812,000
	1.8: Community and civil society effectively participate in WRM activities;	195,000
	1.9: Effective mechanism for adequate and sustainable financing for WRM ;	320,000
	1.10: An effective communication strategy in place and implemented	355,000
	1.11: An effective strategy to promote ICTs applications in WRM in place and implemented	91,000
	Total Outcome 1	7,578,550
2. Cost-effective Water Resources Assessment and Monitoring System in place and operational	2.1: Updated Hydrological database and Water Resources Information System	2,719,000
	2.2: Water quantity and quality status reports regularly published	560,000
	2.3: Water quality Standards established, communicated and enforced	260,000
	2.4: Strategy for assessment, exploitation and monitoring of geothermal water resources developed and implemented;	300,000
	2.5: Point-source pollution of all major water resources controlled	1,128,000
		Total Outcome 2
3. Watersheds and catchments rehabilitated and their ecological functions effectively restored	3.1: Critical Watersheds, catchments and sub-catchments are mapped and their ecological functioning analysed;	1,115,000
	3.2: Micro-catchment and catchment level management rehabilitation and mgt plans developed and implemented;	10,850,000
	3.3: Valuation of National Wetlands undertaken and a national programme for restoration, conservation and management developed and implemented;	3,352,500
	3.4: Invasive species infestation in water systems analysed, controlled and monitored	2,155,000
		Total Outcome 3
4. Efficient and Equitable Water Allocation and Utilisation framework	4.1: Sectoral plans for water demand and utilisation in place and integral part of sectoral planning;	420,000
	4.2: Catchment-based Water Allocation Master plan reflecting rights and obligations of water users developed, disseminated and in use;	1,245,000
	4.3: An incentive structure to Promote water use efficiency and conservation in place and operational;	4,195,000
	4.4 Rainwater harvesting promoted and adopted	1,898,750
	4.5 A framework for integrating gender and social vulnerability issues into water resources development and management is developed and implemented	920,000
	Total Outcome 4	8,678,750
5. An effective framework for Water-related disaster	5.1: Climate change resilience and vulnerability status in key sectors related to water resources established, regularly updated and used to inform policy and planning;	782,5000

management and Climate change mitigation and adaptation in place and implemented.	5.2: National Water balance and water security plan in place and implemented	6,985,000
	5.3: Operational safety plans for Water ways and Water infrastructure installations;	226,500
	5.4: Effective National Disaster Management plan that reflects and prioritises water-related disasters in place and implemented;	2,607,500
	Total Outcome 5	17,644,000
6. Effective framework for management of shared waters	6.1: Trans-boundary Water Cooperation framework in place and integrated into the Country's international relations and regional integration strategies;	279,750
	6.2: National policies, legislation and institutional arrangements harmonised with those of other riparian countries	447,500
	6.3: Rwanda effectively participates in the Nile, Congo, Kagera and Victoria Basin cooperation and management frameworks	1,930,500
	Total Outcome 6	2,657,750
7. Basic capacities developed and Effective framework for WRM Capacity Development and Knowledge Management in place	7.1: Plan and budget for continuous WRM skills improvement and institutional capacity development;	487,500
	7.2: Universities and Training institutions have adequate capacity to train WRM experts, technicians and researchers;	3,040,000
	7.3: Adequate WRM expertise among local service providers	135,000
	7.4: Applied Research Fund in place and includes mechanisms to promote WRM research	825,000
	7.5: Documentation and sharing of lessons and good practices from WRM Programme and related activities	516,000
	7.6: WRM Information exchange programme;	500,000
	7.7 <i>Water for life</i> formal and Informal Education Programme	
Total Outcome 7	5,503,500	
Total	Total Budget for the Strategic Plan	64,502,050

References

- COWI Uganda (2008). Kagera Development of a Kagera River Basin Transboundary Cooperative Framework and Management Strategy in the Four Riparian Countries of Burundi, Rwanda, Tanzania and Uganda. Nile Basin Initiative. Final report.
- CRA, 2006. National Transboundary Diagnostic Analysis for the Lake Victoria Basin - Rwanda. Prepared for the Rwanda Environment Management Authority (REMA).
- GISP (2004). Africa Invaded: The Growing dangers of Invasive Alien species; REMA – Rwanda State of the Environment Report, 2010.
- MINIRENA (2009). Five-Year Strategic Plan for the Environment and Natural Resources Sector. 2009 - 2013).
http://www.childinfo.org/files/RWA_wat.pdf.
- http://minela.gov.rw/IMG/pdf/Final_Report_July_2009_-_March_2010.pdf.
ENVIRONMENT AND NATURAL RESOURCES PERFORMANCE REPORT. MINECOFIN Mutabazi, A (2008).
- UNEP (2010). Africa Water Atlas
- (UNEP (2009). Rwanda: From Post-Conflict to Environmentally Sustainable Development. Post-Conflict and Disaster Management Branch.
- UNEP (2007) Hydropolitical Vulnerability and Resilience along international Waters. Latin America and the Caribbean.
http://www.minicom.gov.rw/IMG/pdf/MINICOM_STRATEGIC_PLAN_2009-2012.pdf
- MINAGRI (2009a). Rwanda Irrigation Master Plan.
- MININFRA (2010). National Policy and Strategy for Water Supply and Sanitation Services. February 2010.
- MININFRA (2008). Transport Sub-sector Strategic Plan. September 2008.
- MININFRA (2008a). National Energy Policy and Strategy .
- MINITERE/SHER (2005). Technical Assistance for the Preparation of the National Water Resources Management Project. Water Data Management. A summary Report.
- MINICOM (2009). Strategic Plan 2009-2012. Moving Up the Value Chain.
- Zaake, B, and Baguma J.B. Review of the Existing Documents for the Navigability of the Kagera River. Nile basin Initiative. NBI, September 2008.