Ministry of Water, Sanitation and Irrigation

Biodiversity, Protected Areas and Tourism Sectoral Integration Plan

KENYA WATER SECURITY AND CLIMATE RESILIENCE PROJECT

Implementation Support Consultancy (ISC) to Support Strengthening of Water Resources Management and Planning

August 2020

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Implementation Support Consultancy (ISC) to Support Strengthening of Water Resources Management and Planning

Prepared for:

Ministry of Water, Sanitation and Irrigation
Water Resources Authority

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Executive Summary

E1. Background, context and objectives

The purpose of this Sectoral Integration Plan with regard to the **biodiversity, protected areas and tourism sectors** in Kenya, is to ensure that the key findings and outputs from the six Basin Plans are properly integrated at sectoral level - in each of the six basins as well as in the country as a whole. The six major river basins of Kenya are Athi, Tana, Lake Victoria South (LVS), Lake Victoria North (LVN), Rift Valley (RV) and Ewaso Ng'iro North (ENN).

E2. Integrated Water Resources Management and Development Plan for the six basins

In order to comprehensively and systematically address the range of water resources related issues and challenges in the six basins and to unlock the value of water as it relates to socio-economic development, ten key strategic areas were formulated as shown below.

Table E1: Basin Plan - Key Strategic Areas and Objectives

Key Strategic Area		Strategic Objective
1	Catchment Management	To ensure integrated and sustainable water, land and natural resources management practices
2	Water Resources Protection	To protect and restore the quality and quantity of water resources of the basin using structural and non-structural measures
3	Groundwater Management	The integrated and rational management and development of groundwater resources
4	Water Quality Management	Efficient and effective management of water quality to ensure that water user requirements are protected in order to promote sustainable socio-economic development in the basin
5	Climate Change Adaptation	To implement climate change mitigation measures in the water resources sector and to ensure water resource development and management are adapted and resilient to the effects of climate change.
6	Flood and Drought Management	To establish and guide a structured programme of actions aimed at ensuring the prevention of, mitigation of, timeous response to, and recovery from, the harmful impacts of floods and droughts across the Basin or specific catchment area.
7	Hydromet Monitoring	An operational and well-maintained hydromet network supported by effective and functional data management and information management systems
8	Water Resources Development	To develop water resources as a key driver for sustainable economic and social development
9	Strengthened Institutional frameworks	To achieve an appropriate balance between operational functionality and the need for effective oversight and governance.
10	Enabling environment to support effective institutions	Improved regulatory responses to strengthen catchment based water resources management

The national estimated budget which is required for implementation of integrated water resources management and development activities up to 2040 in all basins and across all KSAs equals about **29 billion USD**. The **biodiversity, protected areas and tourism** sectors are linked to about **885 million USD** of the National Budget as shown in Table E2, which summarises the proposed implementation budgets from all six Basin Plans up to a planning horizon of 2040, for activities that are relevant to the biodiversity, protected areas and tourism sectors. The KSAs that demand the largest

expenditure from a biodiversity, protected areas and tourism sector perspective are KSA1: Catchment Management and KSA5: Climate Change Adaptation and Preparedness.

E3. Roadmap for sector integration

In order to ensure the successful implementation of the strategies and actions from the six Basin Plans and National Plan as they relate to biodiversity, protected areas and tourism, a Roadmap for Implementation is proposed. This Roadmap proposes that before any actions identified under the KSA implementation plans are implemented, there are preceding critical activities. These are as follows (Figure E1):

1. Immediate KSA activities
    a. Strengthening of institutional capacity and coordination;
    b. Imminent infrastructure feasibility and impact assessments;
    c. Expand on the basin plan knowledge base
2. Financial Resource Mobilisation for the KSA activities
3. Implementation of the short to long-term KSA activities
4. Monitoring and Evaluation of the KSA activities

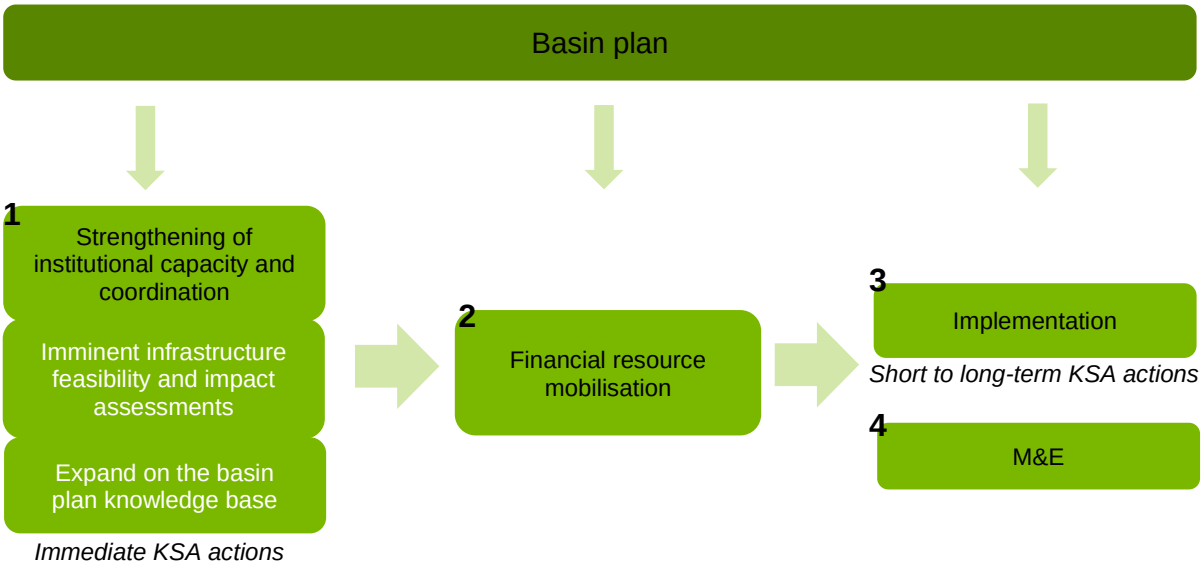

Figure E1: Roadmap for implementation of the Basin Plans

As the strengthening of institutional capacity and coordination is considered an immediate KSA activity, the engagement with role players from various institutions is a priority.

This Sectoral Integration Plan highlights KSAs and themes which are relevant to the **biodiversity, protected areas and tourism sectors** and indicates what immediate actions are required.

Table E2: Summarised IWRM budget for implementation activities linked to biodiversity, protected areas and tourism under specific Key Strategic Areas

Key Strategic Areas and Themes		Budget (USD Million)				
		2020-2022	2022-2025	2025-2030	2030-2040	Total
KSA 1	**Catchment management**	23.5	182.5	159.3	125.2	**490**
	– Promote improved and sustainable catchment management					
	– Sustainable water and land use and management practices					
	– Natural resources management for protection & sustainable use					
	– Rehabilitation of degraded environments					
KSA 2	**Water resources protection**	1.8	4.5	10.5	11.4	**28**
	– Classification of water resources					
	– Reserve determination					
	– Determine Resource Quality Objectives					
	– Conserve and protect ecological infrastructure					
KSA 4	**Water quality management**	5.7	3.3	2.3	3.6	**15**
	– Efficient and effective management of point and nonpoint sources of water pollution					
KSA 5	**Climate change adaptation and preparedness**	21.0	66.7	69.0	46.5	**203**
	– Understand impacts of climate change on water resources at appropriate spatial scales					
	– Climate change mitigation					
	– Climate change adaptation					
KSA 8	**Water resources development**	-	0.3	0.3	0.4	**1**
	– Water based tourism and recreation					
KSA 10	**Strengthen enabling environment to support institutions**	31.5	54.1	26.3	35.8	**148**
	– Develop institutional capacities to support improved IWRM&D					
Total		**84**	**311**	**268**	**223**	**885**

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Annexure A: Stakeholder engagement

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Abbreviations and Acronyms

AGR	Artificial groundwater recharge
AMP	Aquifer Management Plan
ASAL	Arid or Semi-Arid Land
ASM	Artisanal and small-scale mining
AWWDA	Athi Water Works Development Agency
BOD	Biochemical Oxygen Demand
BWRC	Basin Water Resource Committee
CA	Conservation agriculture
CAAC	Catchment Area Advisory Committee
CDA	Coast Development Authority
CFA	Community Forest Association
CGs	County Governments
CIDP	County Integrated Development Plan
CMS	Catchment Management Strategy
CMUs	Catchment Management Units
COD	Chemical Oxygen Demand
CWSB	Coastal Water Services Board
CWWDA	Coastal Water Works Development Agency
DEC	District Environmental Committee
DEF	Drought Emergency Fund
DEM	Digital Elevation Model
DO	Dissolved Oxygen
DSS	Decision Support System
EDCs	Endocrine disrupting chemicals
EDE-CPF	Ending Drought Emergencies Common Programme Framework
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
ENSO	El Niño–Southern Oscillation
ERS	Economic Recovery Strategy
FEWS NET	Famine Early Warning Systems Network
FMCF	Forest Management and Conservation Fund
FRF	Flood Response Forum
GCA	Groundwater Conservation Area
GCM	Global Climate Model
GDEs	Groundwater dependent ecosystems
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GMP	Groundwater Management Plan
GW	Groundwater
ICZM	Integrated Coastal Zone Management

IDA	International Development Association
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resource Management
JICA	Japan International Cooperation Agency
KCCAP	Kenya Climate Change Adaptation Programme
KCDP	Kenya Coastal Development Programme
KCSAS	Kenya Climate Smart Agriculture Strategy
KEWI	Kenya Water Institute
KFS	Kenya Forest Service
KMD	Kenya Meteorological Department
KNCPC	Kenya National Cleaner Production Centre
KSA	Key Strategic Area
KWSCRP	Kenya Water Security and Climate Resilience Project
KWT	Kenya Wildlife Trust
KWTA	Kenya Water Towers Agency
LIMS	Laboratory Information Management System
LPG	Liquefied Petroleum Gas
LSRWSS	Large Scale Rural Water Supply Scheme
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MCM	Million Cubic Metres
MEA	Multilateral Environmental Agreements
MoLPP	Ministry of Lands and Physical Planning
MoLRRWD	Ministry of Land Reclamation, Regional and Water Development
MTPs	Medium Term Plans
MWSI	Ministry of Water, Sanitation and Irrigation
NAP	National Adaptation Plan
NAS	Nairobi Aquifer Suite
NAWARD	National Water Resources Database
NCCAP	National Climate Change Adaptation Plan
NEMA	National Environment Management Authority
NEP	National Environment Policy
NET	National Environmental Tribunal
NGO	Non-Governmental Organisation
NIB	National Irrigation Board
NLC	National Land Commission
NMK	National Museums of Kenya
NPEP	National Petroleum and Energy Policy
NPS	Nonpoint source
NRW	Non-Revenue Water
NWHSA	National Water Harvesting and Storage Authority
NWMP	National Water Master Plan

NWQMS	National Water Quality Management Strategy
POPs	Persistent organic pollutants
PPP	Public Private Partnership
PV	Photovoltaic
RCP	Representative Concentration Pathways
REA	Rural Electrification Agency
RO	Regional Office
RQOs	Resource Quality Objectives
RUSLE	Revised Universal Soil Loss Equation
SANBI	South African National Biodiversity Institute
SCMP	Sub-Catchment Management Plan
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SME	Small and Medium Enterprise
SOPs	Standard operating procedures
SRO	Sub-Regional Office
SSWRS	Small Scale Rural Water Supply Scheme
TA	Transboundary aquifer
TARDA	Tana and Athi River Development Authority
TNC	The Nature Conservancy
USAID	United States Agency for International Development
UWSS	Urban Water Supply System
W/S	Water Supply
WAP	Water Allocation Plan
WASREB	Water Services Regulatory Board
WASSIP	Water Supply and Sanitation Improvement Project
WFP	World Food Programme
Wp	Watt peak
WRA	Water Resources Authority
WRM	Water resources management (also integrated WRM)
WRMA	Water Resources Management Authority
WRUA	Water Resource User Association
WSB	Water Services Board
WSP	Water Service Provider
WSSP	Water Sector Strategic Plan
WSTF	Water Sector Trust Fund
WT	Water Tribunal
WWDA	Water Works Development Agency
WWF	World Wildlife Fund

1 Introduction

1.1 Background and context

Kenya is a water-scarce country and its water resources are currently threatened by various issues. Addressing these issues demand capacity for comprehensive water resources management and planning, coupled with extensive investment in climate resilient water infrastructure. To address these challenges, and to give effect to the constitutional requirement for devolution of functions from National to County level, the Government of Kenya has embarked on a wide-ranging water sector reform programme. As part of this programme, the Government of Kenya received financing from the World Bank toward the cost of implementing the Kenya Water Security and Climate Resilience Project (KWSCRP-1), to be implemented through the Ministry of Water, Sanitation and Irrigation (MoWSI).

This Sectoral Integration Plan constitutes one of the deliverables under Sub-component 2.2 of the KWSCRP-1. This sub-component aims to strengthen the capacity of the Water Resources Authority (WRA) as it relates to water resources management and planning through the development of tools, skills and infrastructure to deliver on its mandate. The outcome will be a stronger WRA institution that has strengthened capacity to carry out its core functions with regard to integrated basin management and planning in a manner that is based on extensive knowledge-driven analysis and that meets the expectations of key stakeholders.

1.2 Objectives of the Sectoral Integration Plan

Integrated Water Resources Management (IWRM) considers the environmental, social and economic aspects of a river basin, and ensures that these aspects are integrated into an overall management strategy. It aims to achieve a sustainable balance between the utilisation, development and protection of water resources.

The purpose of this Sectoral Integration Plan with regard to the **biodiversity, protected areas and tourism sectors** in Kenya, is to ensure that the key findings and outputs from the six Basin Plans are properly integrated at sectoral level - in each of the six basins as well as in the country as a whole.

Figure 1-1 displays the six major river basins of Kenya viz Athi, Tana, Lake Victoria South (LVS), Lake Victoria North (LVN), Rift Valley (RV) and Ewaso Ng'iro North (ENN).

Note: *This sectoral integration plan reviews forestry with regard to the conservation of biodiversity. Forestry as a contributor to livelihoods is dealt with in the Forestry, Land-use and Catchment Management Sectoral Integration Plan.*

1.3 Structure of the Sectoral Integration Plan

This report is structured as follows:

Section 2 provides an overview of the biodiversity, protected areas and tourism sectors in Kenya and summarises key issues, challenges and trends in relation to these sectors.

Section 3 presents an institutional overview, from a sectoral and IWRM perspective, in relation to biodiversity, protected areas and tourism in Kenya.

Section 4 presents strategies and themes which relate to the biodiversity, protected areas and tourism sectors in Kenya, under ten key strategic areas.

Section 5 summarises key outputs, presents the broader context and provides high-level budgets and timelines as a proposed way forward for the integration of the Basin Plans with the biodiversity, protected areas and tourism sectors.

Section 6 provides a conclusion.

Section 7 lists references.

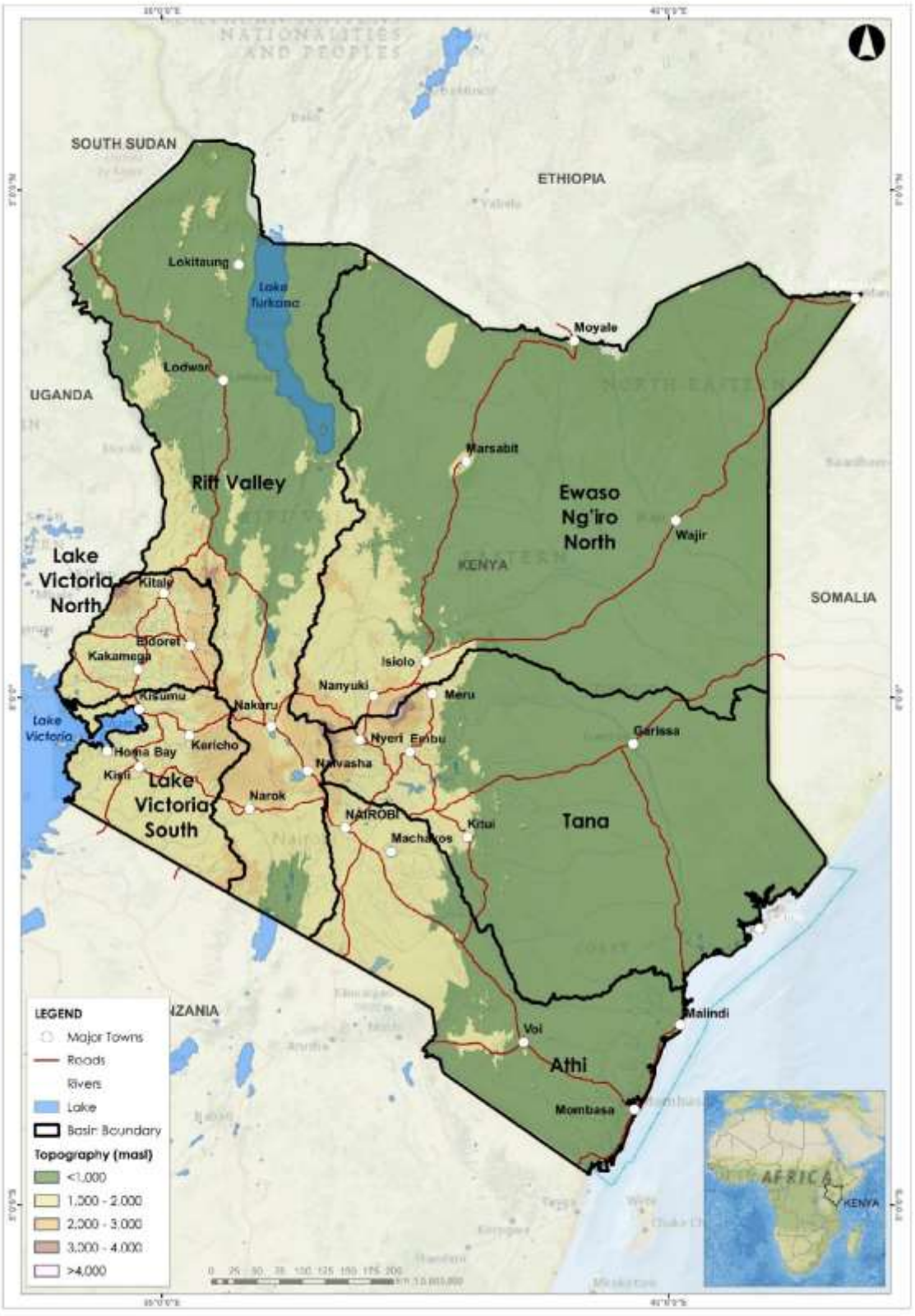

Figure 1-1: Overview map

2 Sectoral overview

2.1 Introduction

The Kenya Vision 2030 outlines a strategy for transforming Kenya into a rapidly industrialising middle-income nation by the year 2030, however, the value of biodiversity inventories for purposes of sustainable development planning has not been considered. The Gross Domestic Product (GDP) of Kenya is presently of the order of 70 billion USD, of which tourism accounts for 10%. Although the contribution of biodiversity to the GDP of Kenya has not been fully quantified, the value of ecosystem services that freshwater ecosystems provide is very high. Biodiversity is fundamental to the Kenyan economy and not only contributes to several key national economic sectors, but also to local economies of people living adjacent to major ecosystems.

This section provides an overview of the **biodiversity, protected areas and tourism** sectors and how they relate to IWRM in Kenya. Furthermore, a brief overview of existing issues, challenges and trends is presented.

2.2 Biodiversity

Aquatic ecosystems, both freshwater and marine, make an important contribution to biodiversity. The freshwater ecosystems are dependent on water resources, particularly in respect of good water quality and the preservation of natural flow patterns in rivers and wetlands. Both good water quality and natural flow patterns are under threat from land use changes in the catchment areas and rapidly increasing water demands, caused amongst others by the growing population, the need for more agricultural land and the exponential growth of urban centres. The destruction of forests in water catchments and wetlands also threatens the biodiversity of animals, birds and plants.

Kenya's freshwater resources are represented by rivers, lakes, wetlands, springs, dams, water pans and groundwater. The main rivers all consequent on the great dome formed by the Central Highlands, the headwaters of which act as "water towers" for downstream systems. The Arid and Semi-Arid Land (ASAL) regions of Kenya consist of non-perennial rivers which are driven by flashy, seasonal flow during heavy rainfall. The wetlands within Kenya are defined according to the Ramsar convention as "areas of land that are permanently or occasionally water logged with fresh, saline, brackish, or marine waters, including both natural and man-made areas that support characteristic plants and animals"[1]. The Ramsar classification of wetland types contains three broad categories: inland; marine and coastal; and human-made; of which Kenya is home to six sub-types: riverine; lacustrine; palustrine; estuarine; marine; and constructed wetlands (Ministry of Environment and Mineral Resources, 2012). Figure 2-1 displays some of the major lakes and wetlands in Kenya.

According to BirdLife International[2] Kenya is home to 1 056 types of birds, of which 43 are globally threatened. There are 68 Important Bird Areas (IBAs) in the country, covering 6 650 062 ha. Most of the IBAs relate to the protected areas in Kenya. Of these IBAs, 21 are in danger. Currently the country has six sites designated as Wetlands of International Importance (i.e. Ramsar sites[3]) covering 265 449 ha. There are three UNESCO[4] natural heritage sites in the country: Mount Kenya National Park/Natural Forest, the Kenya Lake System in the RV Basin and Lake Turkana.

The six Ramsar sites are described below (Ministry of Environment and Mineral Resources, 2012):

[1] Inclusive of swamps, marshes, bogs, shallow lakes, ox-bow lakes, dams, riverbanks, floodplains, fishponds, lakeshores and seashores. They also include coastal and marine wetlands such as deltas, estuaries, mud flats, mangroves, salt marshes, seagrass beds and shallow reefs all of which at low tide should not exceed 6 meters (Ministry of Environment Water and Natural Resources, 2013)
[2] BirdLife International's national partner in Kenya is Nature Kenya
[3] Kenya ramified the Ramsar convention in 1990
[4] Kenya accepted the UNESCO World Heritage Convention in 1991

- Tana River Delta Ramsar site (163 600 ha):
  - The second most important estuarine and deltaic ecosystem in Eastern Africa.
  - Comprises of a variety of freshwater, floodplain, estuarine and coastal habitats with extensive and diverse mangrove systems, marine brackish and freshwater intertidal areas, pristine beaches and shallow marine areas, forming productive and functionally interconnected ecosystems.
  - Rich biodiversity including coastal and marine prawns, shrimps, bivalves and fish, five species of threatened marine turtles and African elephant, Tana Mangabey, Tana River Red Colobus and White-collared Monkey.
- Lake Elmenteita (10 880 ha):
  - A shallow saline, alkaline lake.
  - Local inhabitants depend on the hot springs around Chamka for domestic freshwater supply, subsistence irrigation, and water for livestock. The nomadic Maasai use the area as a grazing and salt-licking site for their livestock.
- Lake Baringo (31 469 ha):
  - Consists of one of the two important freshwater (less alkaline) lakes in the primarily arid Kenyan Rift Valley and its surrounding riparian zones.
  - The lake is an invaluable habitat for seven freshwater fish species, of which one is endemic to the lake. Local fisheries are particularly important for sustainable development of the local communities, for both economic and sport fishing.
- Lake Bogoria (10 700 ha):
  - An alkaline soda lake hydrologically dominated by hot springs, located in Gregory Eastern Rift Valley.
  - The lake's stable water level makes it especially important during periods of drought which reduce levels in other East African lakes.
- Lake Naivasha (30 000 ha):
  - Located in a high-altitude trough of the Rift Valley, one of the few freshwater lakes in eastern Africa. The site comprises a crater lake, river delta, and a separate lake.
  - People depend on the lake for their water supply, and human activities include wildlife and livestock ranching, agriculture, tourism, pastoralism and fishing - the most significant activity, however, is intensive greenhouse floriculture and horticulture.
- Lake Nakuru (18 800 ha):
  - A very shallow, strongly alkaline lake, with surrounding woodland and grassland, fed by four seasonal rivers and the permanent Ngosur River.
  - A number of ecosystems including sedge marshes, seasonally flooded and dry grasslands, swampland riparian forests.

Figure 2-1: Major lakes and wetlands

At least 58 species of fish are known to occur in the Athi River system, four of which were introduced. There is a greater diversity of fish along the lower reaches of the river than along the upper reaches Lake Jipe is of global importance as it is the habitat of the only remaining *Oreochromis jipe*, a fish species which is on the verge of extinction. Along the coastal zone in the **Athi Basin**, areas of rainforest, swamp forest and mangroves occur. The mangrove forest is an important ecosystem in this region.

The main biodiversity area in **Tana Basin** is the Tana River Delta, which is known to include many endemic plants, primates, amphibians and reptiles (Ministry of Environment and Mineral Resources, 2012). The Delta provides a habitat for 320 plant taxa and hosts seven plants on the IUCN Red list (Ministry of Environment and Mineral Resources, 2012). It is a critical feeding and wintering ground for several migratory water birds such as waders, gulls and terns (Birdlife International, 2019; RAMSAR, 2020). The estuaries, mangroves and shorelines provide a habitat for a wide range of fish species and CITES (Convention on International Trade in Endangered Species of Wild Fauna & Flora) shark species have been recorded in the Delta area (Ministry of Environment and Mineral Resources, 2012).

Biodiversity in **LVS Basin** is linked to water resources and forest reserves or protected areas. An important forest reserve is the Mau Forest Complex. The forest occurs on the Mau Escarpment, a block of raised land that forms the western wall of the Rift Valley. There are four main Forest Reserves in LVS Basin: Eastern, Western and South-western Mau and Trans-Mara. The forest is a water tower for streams such as the Sondu and Mara river systems, which flow into Lake Victoria. The areas surrounding the forest are intensively farmed, with human population densities about twice as high on the western side of the forest as on the east (Birdlife International, 2019b). Vegetation patterns are complex, but there is a broad altitudinal zonation from west to east, lower montane forest below 2,300 m giving way to thickets of bamboo *Arundinaria alpina* mixed with forest and grassland, and finally to montane sclerophyllous forest near the escarpment crest (Birdlife International, 2019b). The forest has a rich highland bird community and rare mammals, insects and other plant life. The Maasai Mara is home to approximately 25% of Kenya's wildlife (East Africa Natural History Society, 2017) and is well known for the annual migration of wildebeest. The Reserve has a varied habitat ranging from grassland to forests. Grasslands host the migratory corn crake and the Jackson's widow bird and the woodlands host the grey-crested helmet shrike. The deltaic Nyando wetlands perform important ecosystem services due to its location fringing Lake Victoria. Kusa Swamp has dense stands of *Cyperus papyrus, Vossia cuspidate* and *Phragmites spp.* with associated rare animals and birds (Birdlife International, 2019b).

The major wetland areas in the **LVN Basin** are Kingwal, Yala, Sergoit, Saiwa and Sio-Siteko. Although the Yala Swamp is not a designated protected area, the ecosystem provides major ecological and hydrological functions and is a major source of livelihood for the surrounding communities. Its vegetation is dominated by papyrus, phragmites and typha. The Swamp houses many species, including the threatened Sitatunga antelope and birdlife and endangered fish species. The Sio-Siteko wetland system is shared between Kenya and Uganda. The wetland is an important ecosystem and source of livelihood for surrounding communities, and stores and purifies water flowing into Lake Victoria. Wetland degradation and encroachment is a significant issue in the basin, especially in areas where wetlands are not protected. The Kingwal Swamp is a high-altitude wetland located north of the Nandi hills. It is well known as a breeding site for the Sitatunga antelope (Ministry of Environment and Mineral Resources, 2012). It is also a habitat for crane bird population and the water berry tree which is used by communities.

Biodiversity in **RV Basin** is linked to water resources, wetlands and forest reserves or protected areas. There are several lakes and wetlands in the basin, which are important habitats for a variety of birdlife and wildlife. This includes crocodiles, several endangered bird species and large mammals such as hippopotamus. Lake Turkana is designated as a UNESCO World Heritage Site, while five of the lakes in the basin are designated as Ramsar sites, including Lakes Baringo, Bogoria, Elmenteita, Naivasha and Nakuru.

In the dry **ENN Basin** water is life and maintains diverse and dynamic habitats linked to seasonal water availability. The Lorian swamp is maintained by seasonal flow, which supports acacia woodlands along the course of the Ewaso Ng'iro River floodplain. Sedge and grass species populate the swamped floodplains providing grazing for the large fauna: buffalo and African elephant, as well as habitat for Vervet monkey and Nile crocodile

2.3 Protected areas

Preservation of biodiversity in Kenya is enforced through formalised protected areas in the form of national parks, reserves, sanctuaries, marine protected areas, gazetted water towers and gazetted forests. Terrestrial protected areas cover about 12% of the land surface of Kenya, encompassing freshwater ecosystems such as rivers, lakes, springs and wetlands. Figure 2-2 and Table 2-1 displays and lists some of the main protected areas in Kenya.

The formal protection of natural resources is complex, especially in a country such as Kenya where community livelihood often depends on its use. The most prominent issues that arise with protected areas and community conflict are defined in Section 2.5 below. There are also different institutions involved in the management of protected areas, often with conflicting mandates and strategies – refer to Section 3 for more detail.

The **Athi Basin** hosts 6 National Parks and 1 National Reserve, which provide important wildlife habitats and stimulates tourism in the area. The Tsavo National Park is the largest protected area in the country, with a total area of about 20,800 km^2. The protected marine areas in the basin have a total combined area of 690 km^2, and include the Diani-Chale, Malindi and Mombasa Marine National Reserves.

There are 19 National Parks/Reserves in the **Tana Basin**, including the Kiunga Marine Reserve. The Tsavo East National Park falls partly within the Basin and is one of the largest protected areas in the country. The Tana Basin has three gazetted Water Towers and 18 non-gazetted Water Towers. Although the Tana River Delta is not a protected area, it is an important wetland ecosystem and is one of the most ecologically important wetlands in the country. The Delta is a Ramsar wetland and therefore KWS has a mandate to protect the ecosystem, although this does not exclude sustainable human use.

The **LVS Basin** contains several environmentally protected areas. The Mau Forest Complex, located in the northern part of the catchment, is one of the country's main water towers. It is important to conserve the Mau Forest Complex as it is the main water source of the major rivers in the LVS Basin. Other protected areas include the Ndere Island and Ruma National Parks, the Masai Mara National Reserve and several National Sanctuaries. The LVS Basin has 1 gazetted Water Tower and 10 non-gazetted Water Towers.

The **LVN Basin** contains several environmentally protected areas and is rich in freshwater and forest vegetation. The Mount Elgon National Park is shared between the LVN Basin and the RV Basin, with a total protected area of 169 km^2. Other protected areas are the Kakamega Forest (44 km^2) and Chapkitale (178 km^2) National Reserves, and the Mount Elgon, Cherangani Hills and Mau Forest Complex water conservation forests. The LVN Basin has three important Water Towers: Mount Elgon, Cherangani and Mau Complex forest.

The **RV Basin** contains several environmentally protected areas, including six National Parks and four National Reserves. The largest protected areas are the Sibiloi National Park, with an area of 1 570 km^2 and the South Turkana National Reserve, with an area of 1 109 km^2. Deforestation and forest degradation are rampant in the catchment, especially in the Mau Forest Complex and private forests to the west of Lake Naivasha. The RV Basin has seven gazetted Water Towers and five Ramsar sites.

The Shaba, Buffalo Springs and Samburu National Reserves are situated along the Ewaso Ng'iro River while a large area of the slopes of Mount Kenya is designated as a National Park. The **ENN Basin** has nine Water Towers and two non-gazetted Water Towers (Ngaya Hills and Mukogodo).

Table 2-1: Protected areas

	Athi	Tana	LVS	LVN	RV	ENN
National Parks and Reserves	Nairobi Ol Donyo Sabuk Amboseli Chyulu Hills Tsavo East and West, Shimba Hills Kisite Mpunguti, Mombasa Watamu Malindi Marine	Aberdare Mount Kenya Meru Kora Mwea North Kitui Bisandi Tana River Primate Rahole Arawale Boni Dodori	Masai Mara Ruma Mau Forest Complex	Chepkitale Mount Elgon Saiwa swamp Kakamega	South Island Central Island Sibiloi Lake Nakuru Hell's Gate Mount Longonot	Mount Kenya Samburu Shaba Laikipia Marsabit Malka Mari Buffalo Springs Losai Nyambene,
Water tower (gazetted)	Aberdare Range Chyulu Hills Shimba Hills	Mount Kenya Aberdares Range Nyambene Hills	Mau Forest Complex	Mount Elgon Cherangany Hills Mau Forest Complex	Mount Kulal Mount Nyiro Cherangani Hills Maramanet Loita Hills Mau Forest Complex Mount Kipipiri berdares	Mount Kenya Nyambene Aberdares Range Mount Nyiru Ndotos Matthews Range Kirisia Hills Huri Hills Mount Kulal Mount Marsabit

Figure 2-2:Protected areas

2.4 Tourism

The tourism industry in Kenya is well developed and is the second-largest source of foreign exchange revenue following agriculture. In 2018, tourism accounted for 21 % of total foreign exchange earnings and 12 % of GDP. Wildlife is the major component of tourism in Kenya, accounting for 90 % of safari tourism and 75 % of total national tourism earnings. Approximately 70 % of wildlife populations live in the habitats outside Kenya's formally protected areas, hence the widespread development of ecotourism.

Natural resources for tourism development include geographic features, land forms with picturesque scenery, flora and fauna and places which create an opportunity for sports and recreational activity for tourists. In order to sustain these ecosystems and recreational activities, and the associated tourism industry, there has to be sufficient water resources. Should ecosystems deteriorate due to a lack of water resources or poor water quality, the habitat and wildlife will lose attractiveness and tourism will decrease. Tourism also demands reliable and safe drinking water and sanitation. This applies to the major urban centres as well as to remote tourist areas. Functional wastewater treatment systems are also required to avoid water pollution impacts such as eutrophication and risks to water ecosystems and biodiversity. Tourists should have access to clean, potable water for cooking, cleaning and hygiene. Water is also required to support recreational facilities e.g. water parks, swimming pools and activities like fishing, kayaking, canoeing, and sailing. Relevant government offices should advise potential investors on constraints or challenges linked to water resources in situ, to ensure that tourism products developed are sustainable.

The demand for water supply increases as tourism increases as tourists often consume more water on holiday than they do at home, and even more than the local communities. Governments usually make it a main concern to provide tourists access to plenty of water, as it is important to please international tourists. The water use differs considerately depending on where tourists stay (e.g. at hotels or camp sites) and the type of recreational activities they take part in (e.g. swimming in pools or playing golf). The tourist population is directly proportional to the water consumption and water demand. Development of surrounding tourist areas also increases the water demand. Tourists require a lot of services and facilities such as accommodation, transport, banking, hospitals, leisure etc. Thus, there are additional pressures on water recourses and on land use.

2.5 Key issues, challenges and trends

The water resources of Kenya are currently threatened by many issues. These include human conflict, water quality, soil erosion and sedimentation, climate change, catchment degradation, inadequate monitoring, and planning and management, water availability and supply issues, inadequate resources, uneven spatial and temporal distribution of water resources, anthropogenic encroachment on environmentally sensitive areas, inadequate flood and drought management and various other issues. In addition to the above issues, each basin has location-specific challenges and issues which, coupled with its unique basin characteristics, are an important consideration for effective water resources management and planning at basin and sub-basin level.

Key issues for all six river basins in Kenya were identified through the basin planning process and categorised under the following main categories:

- Biophysical issues;
- Socio-economic issues;
- Water resources issues;
- Institutional issues.

Issues identified in conjunction with stakeholders were presented and addressed based on the framework as depicted in Figure 2-3.

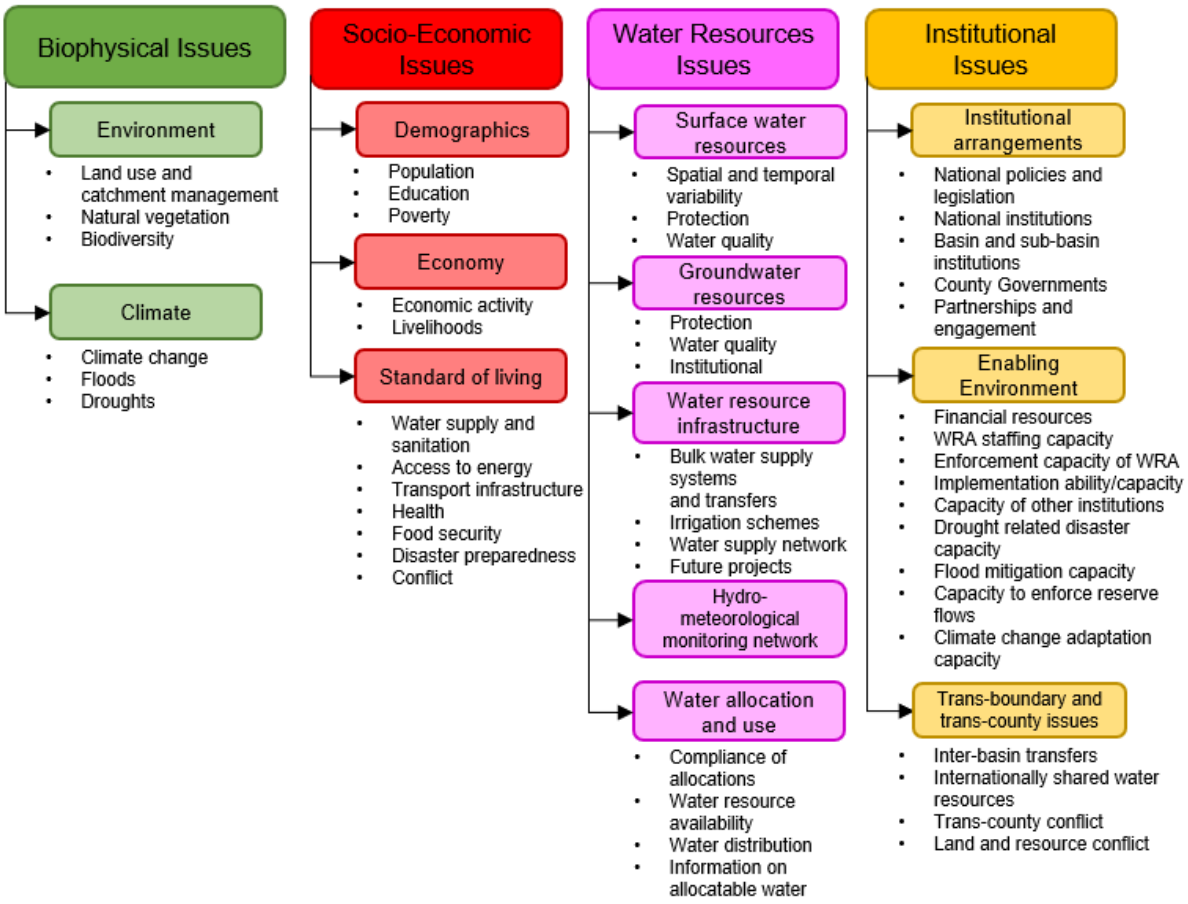

Figure 2-3: Key issues framework

Key biophysical, socio-economic, water resources and institutional issues related to the **biodiversity, protected areas and tourism sectors** in Kenya are summarised in the following sub-sections.

2.5.1 Biophysical issues

2.5.1.1 Environment

The environment encompasses the land, vegetation and biodiversity of Kenya. Sustainable management of the land is necessary to maintain healthy vegetation and biodiversity. Issues arise through poor land use management and vegetation or biodiversity loss. Along with the loss of natural vegetation, human encroachment is resulting in the loss of biodiversity due to habitat loss. Pollution is contributing significantly to water quality issues, while lack of enforcement regarding minimum environmental flows is also inadequate.

Some of the major environmental issues affecting biodiversity, protected areas and tourism in Kenya are defined below:

- Loss of natural vegetation
- Deforestation
- Encroachment of aquatic land and important ecosystems

- Invasive alien species
- Eutrophication and water hyacinth
- Reserve flow requirements that do not account for variability in flow regimes
- Wildlife migration routes impacted by infrastructure

2.5.1.2 Climate

Climate change appears to be taking effect in Kenya. Expected impacts include increased temperature, increased intensity and frequency of extreme climate events as well as unpredictable weather patterns. With more rain falling as heavy storm events it will be less effective, and there will be increased erosion and increased risk of flooding and greater environmental degradation. Higher evaporative demand will also offset any benefits should rainfall possibly increase, also resulting in less effective rainfall (Omwoyo et al., 2017).

Some of the climate issues impacting biodiversity, protected areas and tourism are defined below:

- An increasing temperature predicted for Kenya may result in an increase in evaporation rates and general harsher weather conditions. Water quantity will be affected as a result, as well as water quality due to higher temperatures, land use changes, impacts on rivers and lakes, changes to physicochemical parameters, micro-pollutants and biological parameters. Rising temperatures provides environments conducive for malaria vectors to thrive, therefore creating health issues.
- An increase in the frequency and severity of droughts that is expected in will exacerbate water scarcity, food insecurity and inflation. It could also lead to increased malnutrition and loss of lives and an increase in the number of children dropping out of school due to families migrating to better lands.
- Unpredictable weather changes: Animals that attract tourists will migrate to more favourable habitats and possibly become extinct when they sense the weather patterns changing and are unable to adapt to new climatic conditions. Frequent droughts negatively impact wildlife and biodiversity which can also lead to lower tourist interest.
- Coastal inundation and erosion that damage coastal infrastructure and ecosystems can impact coastal tourist establishments.
- Changing environmental conditions can discourage tourists, i.e. infectious diseases and wildfires.
- Extreme weather events like flooding can deteriorate roads, thus decreasing access to tourist destinations.
- Reduction in Mara River flows has recently negatively impacted the migration of wildebeests through the Mara River from the Serengeti National Park in Tanzania to Kenya's Maasai Mara reserve.
- According to Kenya Wildlife Service (KWS), increased duration of droughts is pushing wildlife, especially water dependent species like elephants, closer to water sources adjacent to human settlements, increasing human-wildlife conflict.
- Increases in average annual temperature can severely affect ecosystems, like the snow caps of Mount Kenya and sensitive marine ecosystems (bleaching of coral reefs).
- Increase the occurrence and transmission of wildlife diseases due to the changing climate

2.5.2 Socio-economic issues

2.5.2.1 Demographics

- Increased population growth and urbanisation has increased the pressure on the environment in urban centres.

- Although there are multiple poverty eradication strategies being implemented in the country there are still challenges with reaching a large and increasing population. Increased poverty makes people more reliant on natural resources with severe impacts on biodiversity and protected areas.
- Subsistence farming and natural resource use are the livelihoods of the rural poor. It is often subsistence farmers who encroach on riparian and wetland areas as these areas receive a good amount of water for crops. Encroachment is usually driven by droughts.

2.5.2.2 Economy and livelihoods

- Those engaging in livelihood activities are usually reliant on natural resources in a catchment. With increasing population and demand, natural resources are being degraded and therefore livelihood activities are not sustainable. Sources of livelihoods vary from pastoralism to subsistence agriculture and crop/livestock farming.
- Aquaculture has been promoted in Kenya as a subsector which can significantly contribute to the national economy by creating employment, earning foreign exchange, reducing poverty and supporting food security. Through this, areas that are unsuitable for aquaculture e.g. rivers, wetlands, lakes and swamps are being promoted as areas for aquaculture, which may have a detrimental effect on biodiversity.

2.5.2.3 Tourism

- Traditional and modern forms of tourism and recreation put pressure on the sustainability of the rural environment. Sustainable tourism planning involves the development and management of tourism in an integrated, controlled and sustainable way; generating optimal benefits for the stakeholders; and minimizing environmental and socio-cultural problems (Okello, 2014).
- Tourists generally favour the more traditional rural landscape in Kenya which offer a greater variation of recreational activities. Thus, visitation to local farms, and purchasing their products and services, provide supplementary income to the local community and indirectly sustains the landscape.
- As the population is growing, the future for wildlife need to be sustained. Economic incentives and conservation-friendly use of private lands, especially in buffer zones around reserves, are essential to the protection of Kenya's wildlife.

2.5.2.4 Conflict

- Human-wildlife conflicts, principally among communities that live in proximity to wildlife areas such as the national parks.
- Illegal encroachment into the water towers and wetlands.
- Resource use conflicts from pastoralist communities.

2.5.3 Water resources issues

Kenya has many water resources challenges, with insufficient water to meet demand in certain locations and during certain times of the year. Domestic, industrial and irrigation demands are expected to increase in the future. Sedimentation of seasonal rivers, dams and pans is an issue as it limits already scarce water resources.

Some of the surface water resources issues impacting biodiversity, protected areas and tourism include:

- Lack of water resource protection due to Resource Quality Objectives (RQOs) not being defined.
- Water quality issues linked to solid waste and effluent, sanitation and sewerage, mining, non-point sources of pollution and sedimentation.
- Over-abstraction and illegal use

- Change in flow regimes due to climate change which affect wildlife migration patterns

2.5.4 Institutional Issues

Institutional issues in Kenya typically include inadequate capacity at WRUA level, inadequate knowledge of integrated water resource management at county government levels, and inadequate reporting frameworks to the public.

Key institutional issues impacting biodiversity, protected areas and tourism are defined below:

2.5.4.1 National policies and legislation

- Conflicting policies, regulations and mandates
- Weak coordination mechanism for policy, strategy, management and marketing activities.
- Poor implementation culture among most sector players.
- Poor tourism investment mechanism. Weak frameworks for resource mobilization and financing of the sector.

2.5.4.2 National institutions

- Uncoordinated institutional roles
- A lack of up to date information, coordinated planning and implementation regarding the tourism sector and relevant protocols is a challenge in Kenya. Resource ecology and management of wildlife and other resource habitats and ecosystems must continue to generate relevant information that will inform modern and appropriate management of these natural resources.
- KWS has still not succeeded in developing and implementing a coherent research agenda. The monitoring and research on wildlife and wildlife habitats is largely resourced and performed by civil society interests, resulting in a statutory authority that follows, rather than leads the wildlife conservation agenda.
- Other tourism issues are:
  - Weak framework for tourism research, monitoring and evaluation.
  - Weak development of touristic infrastructure and ancillary services.
  - Weak mechanisms for the development and enforcement of standards and quality assurance.
  - Poor integration of sustainable tourism development in the destination management and other mainstream services.
  - Weak integration of ICT in the development and management of the tourism value chain.
  - Weak mechanisms for benefit sharing (tourism leakages).
  - Weak integrated mechanisms for the development of international, regional and domestic tourism.
  - Weak approaches to product development, diversification and differentiation.
  - Limited safety and security measures.
- Biodiversity initiatives are constrained by inadequate capacity in respect of financial, human, scientific, technical and technological needs (Ministry of Environment, Natural Resources and Regional Development Authorities, 2015) These constraints have caused inadequate identification and documentation of the biological capital of the country and of changes in biodiversity, slow implementation of legislation and planned initiatives, and inadequate enforcement of legislation, amongst other difficulties.

- An additional challenge to biodiversity conservation in Kenya is the lack of funding for research on biodiversity. The National Museums of Kenya is a state corporation that has collected biodiversity information for over a century. The natural history collections date as far back as the early 1900s and are key in the identification and description of the nation's biodiversity. These are an important component of Kenya's heritage and require an increase in funding to ensure adequate preservation and research and to ensure that their potential to advise policy is achieved.

2.5.4.3 Local institutions

- Inadequate institutions at the local level in the forestry sector
- Weak mechanisms in community ownership and participation. Weak mechanisms for community based tourism.

2.5.4.4 County Governments

- Limited coordination

2.5.4.5 Transboundary and trans-county issues

- An analysis conducted by UNOCHA Kenya, stated that there were over 112 deaths due to conflict over resources in pastoralist areas between January and May of 2011. Compared to the 68 deaths during the same period in 2010, this indicates an increase in deaths due to conflict. Transboundary conflict hot-spot areas include the Uganda-Kenya and Kenya-Ethiopia borders.
- Land conflicts in Nandi county exist in Tindiret and Mosop where adjudication and issuing of title deeds still needs to be done.
- Squatters were evicted by the government from Kipkurere forest, Nandi South forest, Sengalo forest and other public land, resulting in Internally Displaced persons without land.
- There is tension over land held by multinational companies who took over land previously annexed by colonialists. Tensions across ethnic communities resulted in conflict in 1992, 1997 and 2007, and still needs to be resolved (County Government of Nandi, 2018).
- Pending bilateral and multilateral arrangements and partnerships.

3 Institutional Overview

3.1 Introduction

This section outlines the water and the **biodiversity, protected areas and tourism** sectors institutional arrangements from national to county level, and identifies the challenges for coordination between them. Subsequent to Kenya Vision 2030, which was completed in 2007, many strategies and development plans for the biodiversity, protected areas and tourism sectors in Kenya have been developed to provide the direction for the development and the strengthening of these sectors. To ensure that this Sectoral Assessment is representative and aligned with current plans and strategies related to water resources planning and management and biodiversity, protected areas and tourism development, relevant current plans and strategies were reviewed and are briefly described.

3.2 Legislative, Policy and Institutional Framework

3.2.1 Introduction

The Constitution of Kenya (2010) provides the basis for water resources management in the country and recognises this through the right to a clean and healthy environment, through the management and sustainable development of natural resources (which includes both surface and ground water), as well as through the economic and social right "*to clean and safe water of adequate quantities*". Importantly, the State has the obligation to ensure that water is conserved, that development is managed to be sustainable and to ensure that the benefits accrued are shared equitably. Whilst it is noted that the utilisation of natural resources should be for the benefit of the people of Kenya, there is important emphasis placed upon the needs of marginalised communities. Also of importance is the recognition of the link between water and land. As such, this recognition provides the basis for improved integration in the planning, management and sustainable development of natural resources.

3.2.2 National policies

The vision for environmental management stated in Kenya Vision 2030 is "A people living in a clean, secure and sustainable environment". The Biodiversity and Protected Areas Sector is included in this vision. Improvements are required on available data on biological resources, environmental legislation, capacity to monitor compliance to the legislation and enforcement (Government of Kenya 2007).

3.2.2.1 Biodiversity

In conjunction with the 'Sessional paper no. 1 of 1999 on national policy on water resources management policy and development', the **National Environment Policy (NEP)** (Government of Kenya, 2013a) provides an important framework in terms of improved river basin management in that the NEP has the goal of ensuring a "b*etter quality of life for present and future generations through sustainable management and use of the environment and natural resources*". As such, this framework policy has relevance to a number of differing sectors that are engaged in the management of natural resources, including water resources. The objectives of this policy that have relevance to the management of the basins include, amongst others:

There is significant alignment in the objectives and principles laid down in NEP with the current approaches utilised within the Kenyan water sector, and this is aligned with best practice.

A key issue to distil from the 'Sessional paper no. 1 of 1999 on national policy on water resources management policy and development' and NEP concerns the recognition of the value and benefits that are accrued from ecological infrastructure. This refers to the naturally functioning ecosystems that

deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction (SANBI , 2013). Our ability to ensure that ecological infrastructure is managed and maintained will be an essential dimension of our resilience against climate variability and climate change.

3.2.2.2 Protected areas

The **National Wildlife Bill of 2011** states that the Kenya Wildlife Regulatory Authority (KWRA) needs to consult with the Kenya Wildlife Service (KWS) for the establishment of regional wildlife conservation areas for purposes of ensuring ecosystem approach to wildlife conservation and management. The KWS is then responsible for the conservation and management of national parks, provisional wildlife conservation areas, national reserves and sanctuaries under its jurisdiction.

The **National Forest Policy of 2014** provides the policy statements for how the government intends to conserve indigenous forests and manage plantation forests, dryland forests, urban forests and roadside tree planting and farm forestry.

3.2.2.3 Water

Worldwide, there is increased recognition of the importance of water in terms of socio-economic development. This is increasingly emerging through the nexus discussions which acknowledge the interfaces between water, food, energy, and more recently, climatic risks. The findings of the World Economic Forum through their Global Risks Reports which repeatedly reflect water and climate related risks as being the most significant to economic growth.

At national level in Kenya, this sentiment has been mirrored in the development of various forms of national development plans. The **Kenya Vision 2030**, published in 2007, provides the national development blueprint. It is structured around economic, social and political dimensions and notes the important role of water in catalysing growth. National targets outlined in the Vision 2030 that have implications for the water sector include:

- Water and sanitation - to ensure that improved water and sanitation are available and accessible to all by 2030
- Agriculture - to significantly increase the area under irrigation by 2030 for increase of agricultural production
- Environment - to be a nation that has a clean, secure and sustainable environment by 2030
- Energy - to generate more energy and increase efficiency in the energy sector

The **Constitution of Kenya (2010)** provides the basis for water resources management in the country and recognises this through the right to a clean and healthy environment, through the management and sustainable development of natural resources (which includes both surface and ground water), as well as through the economic and social right "*to clean and safe water of adequate quantities*". Importantly, the State has the obligation to ensure that water is conserved, that development is managed to be sustainable and to ensure that the benefits accrued are shared equitably. Whilst it is noted that the utilisation of natural resources should be for the benefit of the people of Kenya, there is important emphasis placed upon the needs of marginalised communities. Also of importance is the recognition of the link between water and land. As such, this recognition provides the basis for improved integration in the planning, management and sustainable development of natural resources.

The **Kenya National Water Resources Management Strategy (2006)** provides the overarching policy framework for water resource management and development in Kenya, despite a number of successive adjustments in the core water legislation. This consistency in policy intent has been critical in guiding the water sector, with legislative amendments being progressively utilised to improve and strengthen the way that policy is affected. At the time of its introduction, the 'Sessional paper no. 1 of 1999 on national policy on water resources management policy and development' (Government of Kenya, 1999) introduced key shifts in policy such as the separation of functions (including water resource management, water service delivery, policy, regulation, financing), the devolution of decision making to regional and local levels, the commercialisation of water (i.e. water to be treated as an economic and social good) and stakeholder participation through community and private sector participation.

3.2.3 Legislation

The water and environmental legislation in Kenya has developed over time and this has enabled successive adjustments in order to improve the manner in which water (and other natural resources) are managed and sustainably developed.

3.2.3.1 Biodiversity

The **Environmental Management and Coordination Act, 1999 (as amended 2015) Cap 387 (EMCA)** is the framework law on the environment in Kenya. The EMCA was enacted to provide an appropriate legal and institutional framework for the management of the environment in Kenya. The Act was amended in May 2015 and took effect on 17 June 2015.

The Act aims to improve the legal and administrative coordination of the diverse sectoral initiatives in the field of environment in order to enhance the national capacity for its effective management. In addition, the Act seeks to align the 77 sector specific legislations pertaining to the environment in a manner designed to ensure greater protection of the environment. This is in line with national objectives and sustainable development goals enunciated in the Agenda 21 of the Earth Summit held in Rio de Janeiro in 1992. The ultimate objective is to provide a framework for integrating environmental considerations into the country's overall economic and social development. In terms of environmental management, the EMCA provides a comprehensive legal and institutional framework for the handling of all environmental issues in Kenya and covers all sectoral laws.

EMCA does not repeal the sectoral legislation but seeks to coordinate the activities of the various institutions tasked to regulate the various sectors. These institutions are referred to as Lead Agencies in EMCA.

The EMCA is supported by several subsidiary Regulations such as Solid Waste Management Regulations (2006), Environmental Management and Coordination (Water Quality) Regulations (2006) and Emissions Regulations (2007), as well as other pertinent International Environmental Regulations.

3.2.3.2 Protected areas

The **Wildlife Conservation and Management Act of 2011** established the Kenya Wildlife Service (KWS) under the new act and outlines KWS functions with respect to conserving and managing national parks, wildlife conservation areas, and sanctuaries under its jurisdiction.

The **Forest Act of 2014** established the Kenya Forestry Service (KFS) under the new act and outlines the KFS functions with respect to forest conservation and management. Forests are classified as public, community or private, with public forests being vested in the KFS and community forests being vested in the County Government. The Act also states that declaration of forests as Nature Reserves can be made for the conservation of forestland of particular environmental, cultural, scientific or other special significance; the preservation of biological diversity and threatened or endangered species.

3.2.3.3 Tourism

According to the **Wildlife Conservation and Management Act of 2011** wildlife user rights can be granted through the Wildlife Conservation Area Committee general permit for non-consumptive wildlife user rights, such as wildlife-based tourism.

According to the **Forests Act of 2014** forests may be used for eco-tourism including recreation, camping, picnicking and cultural activities. Consequently, KFS collaborates with different stakeholders to develop responsible tourism products and activities in forest reserves in Kenya. The products being developed in forest reserves therefore include ecolodges, tree houses, campsites, nature trails and canopy walkways.

3.2.3.4 Water

The promulgation of the **Water Act 2016** aligned Kenya's water sector with the 2010 Constitution and enables amendments to support the improved management of water resources. The Water Act (Act No 12 of 2016) revises the institutional mandates of key water sector institutions and sets out the role of counties in the water sector. The Act recognises that water related functions are a shared responsibility between the National Government and the County Governments. The mandate for the provision of water and sanitation services and the development of county water works is delegated to country governments. The Act defines a clear role for the WRA in the regulation of water resources, which provides a potential strengthening in the way that water resource development is regulated. The Act gives priority to domestic water users over irrigation and other water users. However, there are some ambiguities in the Act which require resolution in order to clarify institutional matters.
The national government remains in charge of the regulation of water services and water resources. It also continues to manage national public water works, which extend across more than one county by nature of the water resource they use and are funded from the national government budget.

The Water Act does not allocate detailed functions of national and county governments in water resource management but provides instead for a National Water Resource Strategy to address this.

The Act established some new institutions and made changes to others, as listed below:

- **Ministry of Water, Sanitation and Irrigation (MoWSI)** as the sector leader and coordinator, taking responsibility to policy development
- The **Water Resources Authority (WRA)**: mandated to protect, conserve, control and regulate the management and use of water resources and to support the Cabinet Secretary in policy formulation and the establishment of a National Water Resource Strategy. Their role includes the formulation and enforcement of procedures/regulations, water abstraction permitting and collecting of water use fees, flood mitigation and advising the Cabinet Secretary generally on the management and use of water resources. The Act requires the development of water resources allocation plans at basin level, and the WRA needs to permit the development of any water source (surface or groundwater).
- **Water Services Regulatory Board (WASREB)** for regulation of water services' providers. Its functions comprise: issuing of licenses to water services boards and approval of Service Provision Agreements, developing tariff guidelines and carrying out tariff negotiations, setting standards and developing guidelines for service provision, publishing the results of sector monitoring in the form of comparative reports.
- National Water Harvesting and Storage Authority for major water infrastructural development,
- **Water Tribunal** for dispute resolution,
- **Water Sector Trust Fund** for water services development towards the un-served and poor segments of the society in peri-urban and rural areas,

- **Water Works Development Agencies** to replace the Water Service Boards. The Water Act provides the Cabinet Secretary for Water with the power to establish an undefined number of Water Works Development Agencies to manage such national public water works, thus replacing the current Water Services Boards.
- **Basin Water Resources Committees** to replace Catchment Advisory Committees (CAACs).
- **Water Services Providers (WSPs)** who, with the **county governments**, provide water and sanitation services in the counties. Operations must be in accordance with a Service Agreement entered between each WSP and WASREB.
- In rural areas where services are not commercially viable, **counties** are now responsible for facilitating access to services, for developing the required infrastructure for distribution, and for contracting community associations, public benefit organizations or private operators to manage such systems (KEWASNET, 2017)
- The **Water Resource User Associations (WRUAs)**: provide community-based management of water resources and resolution of associated conflicts.

Key water sector institutions are shown below.

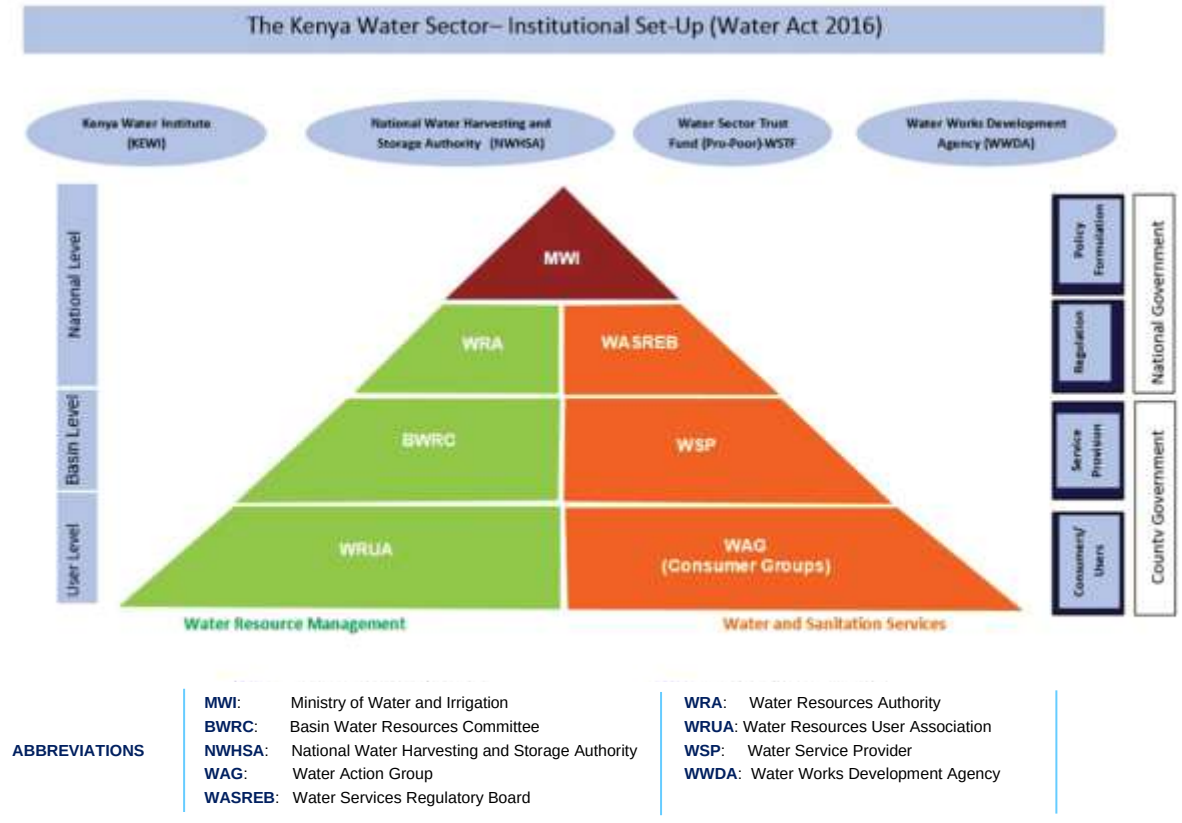

Figure 3-1: Kenya Water Institutions (Water Act 2016)

3.2.4 National institutions and mechanisms

3.2.4.1 National ministries and departments

In the aftermath of the 2017 national elections, the national government in Kenya has undergone some changes in configuration to support a more effective and efficient Government. Whilst there are a

number of Ministries that can be seen as enablers (e.g. Education, Justice etc), the key sector ministries from a basin planning perspective for the **biodiversity, protected areas and tourism** sectors include:

- Ministry of Environment and Forestry (MoEF)
- Ministry of Tourism and Wildlife (MoTW)
- Ministry of Water, Sanitation and Irrigation (MoWSI)

The National Environment Council is responsible for policy formulation and directions for the purposes of the EMCA. The Council also sets national goals and objectives and determines policies and priorities for the protection of the environment. The National Environmental Management Authority (NEMA) is the body charged with overall responsibility of exercising general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. Activities of NEMA are handled by three core directorates: Enforcement, Education and Policy.

The MoTW has a Tourism and Wildlife Department.

3.2.4.2 National level public entities

Whilst the Ministries have the broad ambit to develop policy, under legislation they have established various national level public entities that have the mandate to perform regulatory and developmental functions. These public entities that function at a national level are tabulated, in Table 3-1.

Table 3-1: National level public entities that have relevance to the integration of IWRM in the biodiversity, protected areas and tourism sectors

Institution	Roles and responsibilities*
Ministry of Environment and Forestry (MoEF)	
National Environmental Management Authority (NEMA)	- Co-ordinate environmental management activities being undertaken by lead agencies and promote the integration of environmental considerations into development policies, plans, programmes and projects to ensure the proper management and rational utilisation of environmental resources. - Take stock of natural resources in Kenya and their utilisation and conservation. - Establish and review in consultation with the relevant lead agencies, land use guidelines. - Monitor and assess activities, including activities being carried out by relevant lead agencies, to ensure that the environment is not degraded by such activities and environmental management objectives are adhered to.
Kenya Water Towers Agency (KWTA)	- Coordinate and oversee the protection, rehabilitation, conservation, and sustainable management of Kenya's water towers. - Co-ordinate and oversee the recovery and restoration of forest lands, wetlands and biodiversity hot spots. - Promote the implementation of sustainable livelihood programmes in the water towers in accordance with natural resource conservation.
Kenya Forestry Service (KFS)	- Increase net forest cover - Enhance conservation, sustainable management and utilisation of forests by improving livelihoods in rural areas
National Museums of Kenya (NMK)	- Promote Kenya's heritage by collecting and preserving artefacts and research.
Ministry of Tourism and Wildlife (MoTW)	
Kenya Wildlife Regulatory Authority (KWRA)	- Establishment and review of regional wildlife conservation areas for purposes of ensuring ecosystem approach to wildlife conservation and management
Kenya Wildlife Service (KWS)	- Conserve and manage national parks, wildlife conservation areas, and sanctuaries under its jurisdiction. - Provide security for wildlife and visitors in national parks, wildlife conservation areas and sanctuaries. - Set up a county wildlife conservation committee in respect of each county.

Institution	Roles and responsibilities*
	- Develop mechanisms for benefit sharing with communities living in wildlife areas. - Coordinate the preparation and implementation of ecosystem plans. - Prepare and implement national park management plans. - Assist and advise in the preparation of management plans for community and private wildlife conservancies and sanctuaries.
Ministry of Water, Sanitation and Irrigation (MoWSI)	
Water Resources Authority (WRA)	- Formulate and enforce standards, procedures and Regulations for the management and use of water resources and flood mitigation. - Regulate the management and use of water resources. - Receive water permit applications for water abstraction, water use and recharge and determine, issue, vary water permits; and enforce the conditions of those permits. - Determine and set permit and water use fees as well as collect water permit fees and water use charges. - Provide information and advice to the Cabinet Secretary for formulation of policy on national water resource management, water storage and flood control strategies.
National Water Harvesting and Storage Authority (NWHSA)	- Development of national public water works for water resources storage and flood control. - Maintain and manage national public water works infrastructure for water resources storage. - Develop a water harvesting policy and enforce water harvesting strategies.
Water Works Development Agencies (WWDAs)	- Undertake the development, maintenance and management of the national public water works within its area of jurisdiction. - Operate water works and provide water services as a water service provider, as a transitional arrangement or as instructed by the WASREB. - Provide technical services and capacity building to such County Governments and water service providers within its area as may be requested.
Regional Development Authorities (RDAs)	- Promote integrated water resources development within jurisdictions to ensure equitable socio-economic development

* The roles and responsibilities provided are not comprehensive but provide some of the key functions.

To achieve effective integrated planning and management, there is a need for integrated approaches between different departments and agencies at the national level. However, there are significant challenges in terms of ensuring the alignment in policy and legislation, which requires capacity in the respective institutions, to be able to work in an integrated manner and have the necessary systems to support this integration.

3.2.5 Regional and local level institutions

3.2.5.1 NEMA Regional Offices

There are eight NEMA regional offices that manage the county field offices in Kenya (Table 3-2). County Environmental Committees (CEC) are the District level bodies chaired by respective County Commissioners and bringing together representatives from all the ministries; representatives from local authorities within the province/district; two farmers/pastoral representatives; two representatives from NGOs involved in environmental management in the province/district; and a representative of each regional development authority in the province/district. To each CEC in the country is attached a County Environmental Coordinator who serves as the secretary to the CEC, and as the NEMA Officer on the ground, is charged with responsibility of overseeing environmental coordination among diverse sectors.

Table 3-2: NEMA regional offices

Region	Regional office	Counties
COAST REGION	Mombasa	Kilifi, Kwale, Lamu, Mombasa, Taita Taveta
CENTRAL	Isiolo	Embu, Isiolo, Kirinyaga, Laikipia, Marsabit, Meru, Tharaka-Nithi
NORTH LAKE	Kisumu	Bungoma, Busia, Kakamega, Kisumu, Siaya, Vihiga
NAIROBI METROPOLI	Nairobi	Kajiado, Kiambu, Machakos, Makueni, Muranga, Nairobi
NORTH EASTERN	Garissa	Garissa, Kitui, Mandera, Tana River, Wajir
NORTH RIFT	Eldoret	Elgeyo Marakwet, Nandi, Trans-Nzoia, Turkana, West Pokot, Uasin Gishu
SOUTH RIFT	Nakuru	Baringo, Nakuru, Kericho, Narok, Nyandarua, Samburu
SOUTH LAKE	Kisii	Bomet, Homa Bay, Kisii, Migori, Nyamira

3.2.5.2 KWS Regional office

The KWS headquarters are situated in Nairobi. The main roles at this level are to: advise, facilitate and coordinate activities in the field. Functions at the Headquarters are organized into Divisions. The management of parks, reserves falls under the Park and Reserves division. The goal of the division is to enhance wildlife conservation and management inside and outside protected areas in partnership with communities and stakeholders. The departments in the division include Regulatory Enforcement and Compliance Affairs, Conservation Areas Management, Wildlife Industry Governance and External Linkages and Wetlands and Marine Conservation.

At a local level the KWS has decentralized authority, resources and activities by creating eight conservation areas. These conservation areas are Western, Mountain, Tsavo, Southern, Coast, Central Rift, Northern and Eastern. In each area are several parks and reserves headed by wardens who report to the assistant directors. The strategy of these areas are: enhancing devolution of activities and resources, enhancing KWS's presence country wide, increasing KWS influence beyond protected areas, improved collaboration with communities and stakeholders and increased management efficiency and effectiveness.

3.2.5.3 Forest conservancy and extension services

KFS manages forests within ten Conservancies, 47 Ecosystem areas, and 250 Forest Stations. The conservancies are the Western Conservancy, Coast Conservancy, Eastern Conservancy, Central Highlands Conservancy, Mau Conservancy, Nairobi Conservancy and North Rift Conservancy.

3.2.6 Basin and sub-basin institutions

Noting the requirements of Integrated Water Resources Management, institutions have been established at basin and sub-basin levels to improve the day-to-day management of water resources as well as to improve the regulation and oversight required to ensure that water is efficiently used in accordance with water use permits. Under the auspices of the 2016 Water Act, this is achieved through the six Regional and 26 Sub-Regional Offices of the Water Resources Authority (WRA) and the Water Resource User Associations (WRUAs).

Each of the six basins in Kenya has a **WRA Regional Office (RO) and a number of Sub-Regional Offices (SROs).** Each SRO looks after a number of Catchment Management Units (CMUs), delineated

based on hydrological and water resource considerations. Water users apply for water permits through the relevant WRA SRO, and the application is then sent to the RO for processing. Class A to C permits are handled at RO level, while Class D permits are handled at Head Office. A hydrological or hydrogeological assessment report conducted by a qualified professional must be submitted by the water user with the application. The water permits are recorded in the Water Permit Database at the RO.

Table 3-3 WRA sub-regions, offices and CMUs

Basin	Sub-Region	WRA SRO	CMUs
Athi (RO: Machakos)	Upper Athi	Kiambu	Ruiru, Ndarugu
	Mbagathi - Nairobi	Nairobi	Mbagathi/ Nairobi
	Middle Athi	Kibwezi	Thwake
	Noltresh - Lumi	Loitokitok	Tsavo
	Coastal - Athi -Mombasa	Mombasa	Coastal Zone/ Mombasa
Tana (RO: Embu)	Upper Tana	Murang'a	Sagana-Gura, Lower Sagana, Upper Thika and Lower Thika
	Thiba	Kerugoya	Tana, Karaba, Ena and Thiba
	Kathita - Mutonga	Meru	Mutonga, Kathita, Ura / Tharaka
	Tiva - Tyaa	Kitui	Tiva and Lower Reservoirs
	Lower Tana	Garissa	Lower Tana, Ijara / Lamu
LVS (RO: Kisumu)	Northern Shorelines / Nyando	Kisumu	Northern Shorelines, Upper and Lower Nyando
	Southern Shorelines / Gucha-Migori	Kisii	Southern Shorelines, Gucha and Migori
	Mara / Sondu	Kericho	Sondu, Upper and Lower Mara
LVN (RO: Kakamega)	Kipkaren – Upper Yala	Eldoret	Kipkaren, Upper Yala
	Elgon – Cherangani	Kitale	Upper Nzoia, Middle Nzoia, Sio-Malaba-Malakisi, Mount Elgon
	Lower Nzoia - Yala	Siaya	Lower Nzoia, Lower Yala
RV (RO: Nakuru)	Lower Turkwel	Lodwar	Lake Turkana Basin, Lokitipi Plains
	Upper Turkwel	Kapenguria	Upper Turkwel
	Lakes Baringo/ Bogoria	Kabarnet	Upper Kerio, Suguta River, Lakes Baringo/ Bogoria
	Lakes Naivasha/ Nakuru	Naivasha	Lakes Nakuru/ Elementaita, Lake Naivasha
	South Rift Valley	Narok	Upper and Lower Ewaso Ng'iro South
ENN (RO: Nanyuki)	Engare Narok – Merghis Upper Ewaso Ngiro	Rumuruti	Ewaso Narok, Nundoto
	Upper Ewaso Ngiro	Nanyuki	Upper Ewaso Ng'iro, Nanyuki
	Middle Ewaso Ngiro North Ewaso Laggas	Isiolo	Middle Ewaso Ng'iro, Lower Ewaso Ng'iro
	Ewaso Daua	Mandera	Daua, Ewaso Laggas, Lower Ewaso Ng'iro
	North Ewaso Laggas	Marsabit	Daua, Chalbi and Ewaso Laggas

At a more localised level, the establishment of the **Water Resource User Associations (WRUAs)** has been essential in ensuring a focus on the operational management functions within a sub-basin. WRA has delineated Kenya into 1 237 sub-catchment areas with the intention of forming Water Resources

User Associations (WRUAs) for each. The WRUAs are community-based, voluntary associations made up of water users and riparian owners interested in proper management of their water resources and were established to enable the collaborative management of water resources and to provide essential support in the resolution of conflicts concerning the use of water resources. Crucially, the Water Act 2016 makes provision for BWRCs to be able to finance WRUAs for services rendered under contract. To date, WRUAs have performed important local functions, but have faced an array of challenges that have served to hinder their effectiveness. Many of these are enabling factors such as capacity in terms of having sufficient skills and training, but also include such issues as inadequate equipment and in sufficient financial resources. These challenges will require redress in order to support the implementation of this Basin Plan and realise the local level capacitation that can unlock the localised socio-economic development required to support Vision 2030. This is supported by the 2016 Water Act that provides in Section 29 (3) that "*basin area water resources management strategy shall facilitate the establishment and operation of water resources user associations*".

Sub catchment management plans (SCMP) is a planning tool that is developed by the Water User Associations (WRUA) under regulation by the Water Resources Authority (WRA). Its main objective is to guide the implementation of water resources management and regulation activities within a defined period of time in any given sub catchment. The activities, in most cases, relate to catchment protection, pollution control and water infrastructure development.

The 2016 Water Act in effect strives to strengthen the management of water resources at the basin and sub-basin level, whilst strengthening the regulatory role of WRA both at national and basin scales. This not only removes the dichotomy that WRA faced as being manager and regulator, but also attempts to create a stronger management regime within the basins and sub-basins, noting that counties have a key role to play in water service delivery as well as ensuring that water is used efficiently within their jurisdictions. To this end, the 2016 Water Act introduced **Basin Water Resource Committees (BWRCs)** as a replacement for the previous Catchment Area Advisory Committees (CAACs), with a more managerial intent than the purely advisory role that was played by the CAACs. At this juncture, during what is effectively a period of transition, the BWRCs will initially provide a more advisory function, however, it will be critically important to learn from the challenges that were experienced with the CAACs so that the BWRCs become more effective in supporting water resource management. The regulatory function of the WRA will continue to be strengthened and, in the transition period, ring-fencing of staff within the Regional and Sub-Regional Offices will be essential to separate staff and functions that are managerial in nature, and as such, supportive of the BWRCs. The BWRCs fall under the WRA, and their responsibilities (which must be delegated by WRA) include the formulation of Basin Water Resources Strategies, management of basins, advice to WRA and the facilitation of WRUA establishment. The BWRCs may contract WRUAs as agents to perform certain duties in water resource management. There are conflicting mandates for the BWRCs in the Water Act (2016) where they have both advisory and management functions. ISC has an understanding that the BWRCs will remain advisory for the foreseeable future with a long-term plan of making the BWRCs have an executive role. There is a need to develop tools to support the operationalisation of the BWRCs, when they are finally established, and to ring-fence WRA staff at the Ros who will provide both technical and secretariat services to the BWRCs. The actual responsibility and how the BWRCs will work with WRA at the regional offices will only be clear once the mandates are agreed upon.

3.2.7 County governments

The 2010 Constitution introduced a decentralised system, with 47 county governments and one national government with specific functions accorded to the two levels. Guided by the overarching objectives and principles of the county governments as set out in the Constitution, specific functions of counties are provided in Schedule Four of the Constitution. Handing over environmental functions to county governments has been a challenge.

3.2.8 Institutional coordination

The MoEF and MoTW are jointly responsible for the biodiversity, protected areas and tourism sectors. These sectors are closely aligned and rely on each other to be sustainable. Figure 3-2 indicates the key institutions involved in the coordination of the biodiversity, protected areas and tourism sectors.

3.2.8.1 Biodiversity

The mandate of the MoEF is to protect, conserve and manage the environment and natural resources for socio-economic development. This is achieved through various departments and divisions; and government agencies, i.e. the National Environment Management Authority (NEMA); Kenya Water Towers Agency (KWTA) and Kenya Forest Service (KFS).

At the local scale NEMA has Environmental Committees who provide technical support for environmental management and provide input to CIDPs through the County Field Offices.

The KWTA looks after Kenya's water towers. The Forest Management and Conservation division under the KFS is charged with the management and conservation of the natural forests in Kenya, of which most form water towers. Strategic outputs involve increasing percentage cover through tree planting and gazetting new forests; as well as improving livelihoods. The Division includes forest biodiversity conservation, participatory forest management and fire management, natural forest management, licencing and eco-tourism.

3.2.8.2 Protected areas and Tourism

The mandate of the MoTW includes policies and standards for tourism and wildlife; protection of wildlife heritage; management of National Parks, Reserves and Marine Parks; development and promotion of tourism and wildlife conservation; education and awareness; wildlife biodiversity management and protection; collaboration with wildlife clubs of Kenya and management of wildlife dispersal areas in collaboration with Partners. This is achieved through various institutions, of which the Kenya Wildlife Service (KWS) is considered to be the most relevant to the Basin Planning process.

The Parks and Reserves division of the KWS manages the National Parks, National Reserves, National Sanctuaries, Marine National Parks and Marine National Reserves in the country. KWS exercises mandates over the main rivers, not just in areas within parks and reserves, but also as the custodians of Kenya's biodiversity, a role they are committed to through the Nagoya Protocol of the Convention of Biological Diversity. Kenya ratified the Protocol in May 2014, which obliges states to develop appropriate domestic measures for effective management of biodiversity in relation to access to genetic resources, benefit-sharing and compliance. Biodiversity in wetlands and sections of the river flowing through protected areas also receive protection by KWS.

The KFS Forest Farm and Dryland Forestry program provides technical support to the Counties, advisory services for forest management, promoting biomass energy development and utilization, promote dryland forest conservation and promote participatory forest extension methodologies including farmer field schools. Issues in the forestry sector are weak institutions arising from weak governance structures and inadequate capacity for law enforcement and weak stakeholder participation in forest management and governance. This is exacerbated by inadequate funding of the forestry sector from the exchequer, civil and public sectors. Since the enactment of the new Constitution in 2010, nationally and within the basin, the level of public support to the conservation of forests has increased significantly but has not been matched by an equal measure of resource allocation in all sectors. For example, the Forest Management and Conservation Fund (FMCF) established in the Forests Act 2005 and the Forest Management and Conservation Act No.34 2016 (The Forest Conservation and Management Act, 2016) to promote the development of forests, maintenance and conservation of indigenous forests, the promotion of commercial forest plantation, provision of forest extension services, the establishment of arboreta and botanical gardens, and a variety of other purposes outlined in Forest Act is yet to be fully operationalised. Furthermore, there are conflicting institutional mandates as is

evident from the overlapping mandates, programmes, projects, and conflicting policies and legislation. Overall, forest conservation has witnessed increased cases of political interference in the management of forests, poor governance as well as inadequate and/or weak structural/institutional capacity for forest law enforcement and governance.

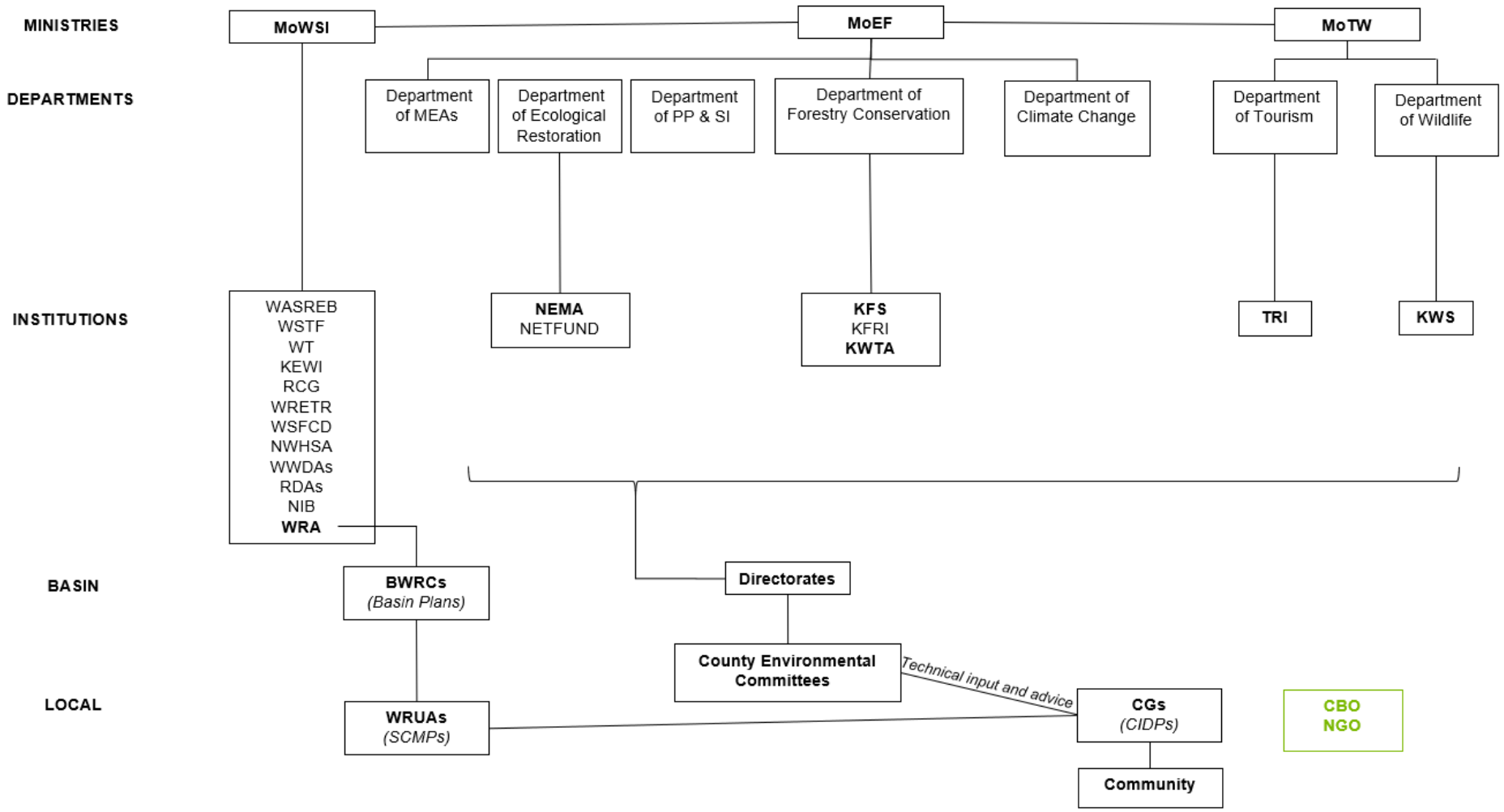

Figure 3-2: Key institutions involved in the biodiversity, protected areas and tourism sectors in Kenya

3.3 Existing Planning

3.3.1 Biodiversity

3.3.1.1 NEMA strategic plan (2019-2024)

The NEMA strategic plan provides a situational analysis of the previous strategic plan and outlines future objectives and strategies. The objective of promoting a sustainable blue economy and promoting green and circular economy will require cooperation with the agriculture and water sectors. Key challenges with the previous strategic plan period (2013-2018) were inadequate funding, low implementation of the devolved environmental functions, overlap in mandates with lead agencies and poor land use planning.

3.3.1.2 KWS strategic plan

According to the KWS annual report (2017) the KWS protects about 8% of Kenya's land mass. Protected areas are gazetted landscapes/seascapes that have been surveyed, demarcated and gazetted either as National Parks and/or National Reserves. Protected areas comprise of 23 terrestrial National Parks, 28 terrestrial National Reserves, four marine National Parks, six marine National Reserves and four national sanctuaries. Protected areas in Kenya are categorized either as parks, i.e. only tourism and research, or reserves, i.e. human activities are allowed under specific conditions. Most protected areas are not fully fenced therefore wildlife can move in and out of the protected area in search of pasture or water. This requires a strategic partnership with communities living in wildlife areas to limit human-wildlife conflict. This is enacted through the devolution of wildlife related activities to the county level. Stakeholders involved in wildlife management include local communities, members of parliament, members of the county assemblies, opinion leaders, county administrators, NGOs, civil society, private ranchers, researchers and research institutions, and government departments at local level, among others. Some of the factors promoting human-wildlife conflict include: increased human population, lack of spatial land use plans and a national land use policy, climate change issues and inadequate resources to address wildlife management issues. In order to limit the impact of conflict the

KWS has implemented erection of wildlife proof barriers such as electric fences; active problem animal control and translocation of wildlife; facilitating payment of wildlife compensation claims; Corporate Social Responsibility (CSR) programmes and community enterprise; wildlife conservation stewardship; Honorary Wardens and Education programmes. KWS assists in drilling boreholes, excavation of earth dams and piping water to safe areas for Human use. Emphasis is given to key ecosystems with abundant wildlife and especially in dry season dispersal areas. KWS recognizes that water is an essential resources that influence the livelihoods of communities and their general views about wildlife. In several isolated situations, KWS trucks water to vulnerable communities and their livestock.

Under the tourism sector, KWS contribution in increasing quality hotel beds is significant. It also contributes to Kenya's quality tourism products which lead to increase in domestic, regional and international visitors. Projects involve improving the premium parks facilities and encouraging tourism at under-utilised parks.

3.3.1.3 Kenya National Obligations with respect to MEAs

The KWS, on behalf of the Government of Kenya is the focal point and implementing agency for Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)[5], Ramsar Convention[6] and the Convention on the Conservation of Migratory Species (CMS)[7]. The KWS also participates in the implementation of other MEAs such as the World Heritage Convention[8] and specifically on matters of World Heritage Sites.

Other environmental conventions that KWS is a major stakeholder but not the focal point include the Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNFCCD). KWS is also a major stakeholder in the Nagoya Protocol.

3.3.1.4 Adaptation Plan (2015-2030)

The Kenya National Adaptation Plan (NAP) (GoK, 2016) provides a background of Kenya's national circumstances, including socio-economic circumstances; and future climate scenarios that the country needs to consider in decision making, planning and budgetary processes. A vulnerability analysis is also presented against the identified hazards in the NCCAP, namely drought, floods, and sea level rise. It proposes macro-level adaptation actions and sub-actions in 20 planning sectors (including agriculture), categorising them into short-, medium- and long-term time frames. For each sector, the NAP identifies gaps, estimates costs of the macro-level actions projected to 2030, and identifies key institutions required for their implementation. It also proposes adaptation indicators at county, sectoral and national levels for monitoring and evaluation (M&E).

3.3.1.5 National Climate Change Action Plan and National Adaptation Plan (2018-2022)

The Kenya National Climate Change Action Plan (NCCAP) (GoK, 2013) framework is highly relevant to the link between agriculture and water resources planning and management. Climate change is a major risk enhancer in relation to water security and agriculture. The NCCAP supports efforts towards the implementation of the Kenya Constitution 2010 and the attainment of Vision 2030. It addresses the enabling aspects of finance, policy and legislation, knowledge management, capacity development, technology requirements and monitoring and reporting. The comprehensive NCCAP document is supported by almost sixty technical reports developed by teams of international consultants guided by Kenya based thematic working groups and under the oversight of a multi-sectoral multi-stakeholder taskforce.

3.3.1.6 Upper Tana-Nairobi Water Fund

The Nature Conservancy (TNC) has developed a business case for the Upper Tana-Nairobi Water Fund. Current partners and investors are: Nairobi City Water & Sewerage Company, Kenya Electricity Generating Company (KenGen), Pentair Inc, Coca Cola, East Africa Breweries Ltd, International Centre for Tropical Agriculture (ICTA), Global Environment Facility (GEF), The Government of Kenya, Water Resources Management Authority (WRMA), Tana & Athi Rivers Development Authority (TARDA), International Fund for Agriculture (IFAD) and Frigoken Kenya Ltd. The fund's business case showed that a $10 million USD investment in water fund-led conservation interventions is likely to return $21.5 million USD in economic benefits over a 30-year timeframe.

[5] Ratified in Kenya in 1979
[6] Kenya signed in 1990
[7] Ratified in 1979
[8] Ratified in 1972

3.3.2 Protected areas

3.3.2.1 National Forestry Programme (2016-2030)

According to the National Forestry Programme (2016-2030) most of the forest land in Kenya is under community and private ownership while 23% is public. As forestry is a devolved function, county governments have the responsibility of implementing specific national government policies on natural resources and environmental conservation. Counties therefore have a shared responsibility in meeting the national target of 10% forest cover and are expected to raise their current individual forest cover. The relevant programmes under the NFP (2016) are under the theme “Forests for water” and involve watershed conservation and management and soil conservation and management. These will be implemented with lead agencies and key stakeholders.

3.3.2.2 KFS Strategic Plan (2017-2022)

According to the KFS Strategic Plan (2017-2022) the KFS flagship projects involve rehabilitation of water towers (i.e. Mau Escarpment, Mt. Kenya, Aberdare Ranges, Cherangany Hills and Mt. Elgon) and management of water catchments; conservation and management of mangroves forests; farmland and dry land tree-planting initiative; forest plantation development; forest protection and security programme; promotion of bamboo establishment and utilization; and control of invasive species. Tree planting is being promoted in order to realise the 10% forest and tree cover increase by 2030 and promotes commercial tree species in ASALs in order to control desertification and improve livelihoods.

The Forest Management and Conservation division under the KFS is charged with the management and conservation of the natural forests in Kenya, of which most form water towers. Strategic outputs involve increasing percentage cover through tree planting and gazetting new forests; as well as improving livelihoods. The Division includes forest biodiversity conservation, participatory forest management and fire management, natural forest management, licencing and eco-tourism.

3.3.3 Water resources development and management

3.3.3.1 National Water Master Plan 2030

The NWMP 2030 was completed in 2013 and covers all six river basins in Kenya. For each basin, the NWMP 2030 provides information related to water resources, water demands, high level water allocations, economic evaluations of proposed interventions and implementation programmes. In addition, the NWMP 2030 presents development plans related to water supply, sanitation, irrigation, hydropower and water resources. The aim of the plan was to form a framework for the development and management of Kenya’s water resources in line with the country’s social and economic development goals. The specific objectives of the NWMP 2030 were set based on the National Water Policy 1999, as well as the targets identified in the Kenya Vision 2030. The NWMP 2030 includes nine Sectoral Development Plans covering different sectors.

3.3.3.2 Catchment Management Strategies (2015 – 2022)

Each of the six basins have a Catchment Management Strategy (CMS) for the period 2015-2022. The CMS provides a vision and framework for the management of water resources and related land resources in the basins and outlines how the concept of integrated water resources management should be implemented at catchment level. It proposed water resources and related strategies for:

- **Protection of the right to water:** Management approaches; Water balance and demand management; Water allocation and use management
- **Water resource protection:** Water resource protection; Catchment protection and conservation

- **Resource augmentation adaptation and development:** Flood and drought management; Climate change adaptation; Water resources infrastructure development; Rights based approach; Livelihoods enhancement

Implementation, information management and financing: Institutional strengthening; Monitoring and management; Financing and implementation

3.3.3.3 Sub-catchment management plans

WRA has delineated Kenya into 1 237 sub-catchment areas with the intention of forming WRUAs for each. These WRUAs are at varying stages of development across the country (Table 3-4). Sub catchment management plans (SCMPs) are planning tools developed by the WRUAs under regulation by the WRA. Its main objective is to guide the implementation of water resources management and regulation activities within a defined period of time in any given sub catchment. The activities, in most cases, relate to catchment protection, pollution control and water infrastructure development. Being the lowest planning tool developed to implement the National Water Master Plan and the basin area plan, it is directly held in the custody of the WRUAs who are in charge of its implementation. The plan is a resource mobilization tool that the WRUA uses to source for implementation funds and other resources.

The constitution 2010, Fourth Schedule Part 2, section 10, outlines water resource management as a function of the county government. This devolvement of the conservation role to the counties creates a direct linkage between the SCMP and the County Integrated Development Plan (CIDP). The county sets aside funds for the management of catchments that are absorbed through the implementation of SCMP or directly through CIDP identified activities. The regulation of the process to ensure the catchments are well protected and the harmony of the two planning perspectives rests with the Authority.

The six Basin Plans have been used as a reference document in the preparation of the SCMPs. As SCMPs are resource mobilisation tools for the WRUAs, these will have an impact on the land and water resources within protected areas and tourist destinations.

Table 3-4: Stages of formation of WRUAs and number of SCMPs developed (2019)

	Athi	Tana	LVS	LVN	RV	ENN
No. sub-catchments	309	240	137	106	175	270
WRUA formed	150	170	106	94	83	92
SCMPs developed	53	77	46	34	48	50

3.3.3.4 Regional development plans

The regional bodies within the six basins (Table 3-5) are responsible for development activities within their respective areas of jurisdiction. The development plans of these regional bodies will need to be updated with the proposed development options from the National Plan. This will impact water security for the biodiversity, protected areas and tourism sectors, and the respective regional bodies within KFS and KWS will need to review the outcome.

Table 3-5: Regional development bodies

Basin	Development Authority
Athi	Tana and Athi River Development Authority (TARDA)
	Coast Development Authority (CDA)
Tana	Tana and Athi River Development Authority (TARDA)
	Coast Development Authority (CDA)
LVS	Lake Basin Development Authority (LBDA)

Basin	Development Authority
LVN	Lake Basin Development Authority (LBDA)
RV	Kerio Valley Development Authority (KVDA)
	Ewaso Ng'iro South Basin Development Authority (ENSDA)
ENN	ENN River Basin Development Authority (ENNDA)

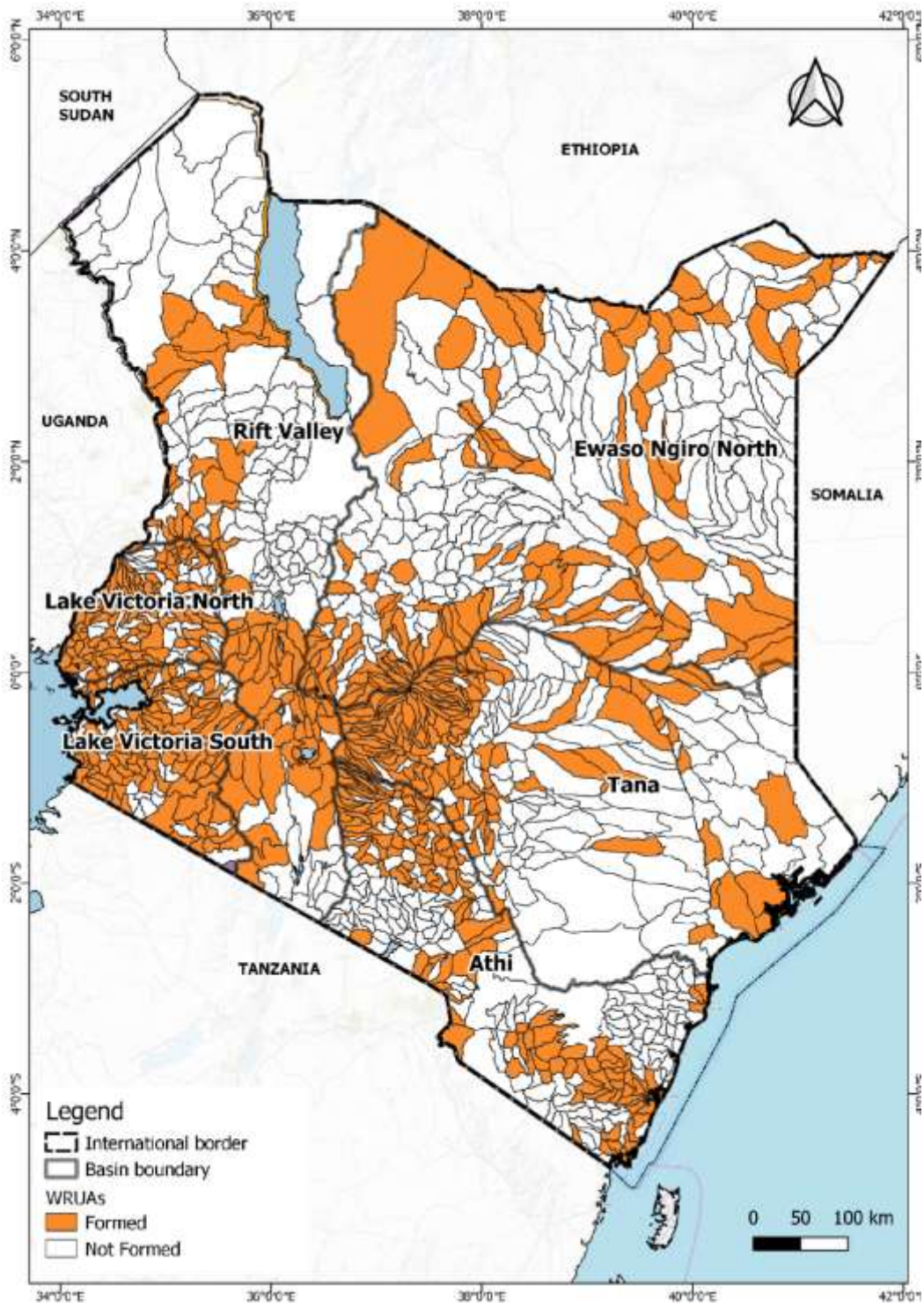

Figure 3-3: WRUA status

3.3.3.5 Projects planned by Water Works Development Agencies

Following the enactment of the Water Act 2016, Water Services Boards (WSBs) have transformed into Water Works Development Agencies (WWDAs).The WWDAs have ongoing and proposed projects that vary from rehabilitation of water supply schemes, extension of service lines, construction of storage tanks and drilling and equipping of boreholes in all the counties, to major dam and water resource projects. The projects planned by WWDAs will need to be updated with the proposed development options from the Basin Plans.

Table 3-6: Water Works Development Agencies

Basin	Development Agency
Athi	Athi Water Works Development Agency (AWWDA)
	Tanathi Water Works Development Agency (Tanathi WWDA)
	Coast Water Works Development Agency (CWWDA)
Tana	Tana Water Works Development Agency (Tana WWDA)
	Coast Water Works Development Agency (CWWDA)
	Northern Water Works Development Agency (NWWDA),
	Tanathi Water Works Development Agency (Tanathi WWDA)
LVS	Lake Victoria South Water Works Development Agency (LVSWWDA)
	Rift Valley Water Works Development Agency (RVWWDA)
LVN	Lake Victoria North Water Works Development Agency (LVNWWDA)
RV	Rift Valley Water Works Development Agency (RVWWDA)
ENN	Northern Water Works Development Agency (NWWDA)

3.3.4 County integrated development plans

County Integrated Development Plans (CIDPs) are prepared every five years by counties as a road map for development. The plan touches on all sectors devolved to county governments, providing a plan towards improvement. Catchment protection and water and sanitation services are devolved functions and as such feature in all CIDPs. A review of the CIDPs showed that planned activities related to water resources mainly revolve around rehabilitation of old pipe networks, extension of distribution network, development of new water sources including boreholes and small dams/pans, extension of sewer networks and expansion of sewer treatment plants.

The key development aspects of each CIDP which are relevant to water resources management in the counties related to the biodiversity, protected areas and tourism sectors are briefly described in Table 3-7.

Table 3-7: Key aspects of the CIDPs in relation to biodiversity, protected areas and tourism

Basin	County	Natural Resources
Athi	Kiambu CIDP (2018-2022)	Programmes include promoting a clean environment through county environmental monitoring and management, enabling policy, solid waste management and environmental education. To increase forest cover and for sustainable management of natural resources programmes include forest conservation and management to increase forest cover to 20%, map cover, relocate people, wildlife conservation and security, reclaiming quarry sites.
	Nairobi CIDP (2018-2022)	Proposed strategies include fencing National Parks, a river rehabilitation programme, legal and policy enforcement, tourism promotion and a reforestation and afforestation programme. New projects include riparian, wildlife and migratory management plans.
	Machakos CIDP (2018-2022)	Programmes include enabling policy, catchment rehabilitation, tree planting, alternative energy sources, awareness on rain water harvesting, rehabilitation of degraded rivers, solid waste management.
	Kajiado CIDP (2018-2022)	Programmes include policy development, climate change training, solid waste and pollution control, forest and riparian area restoration and rehabilitation of quarries.
	Makueni CIDP (2018-2022)	The county views natural resources as natural assets for economic production or consumption. Sustainable management of these resources involve mineral mapping and development, environmental conservation and enhanced tourism infrastructure development.
	Taita Taveta CIDP (2013-2017)	Taita Taveta has lakes, rivers, springs, wetlands, forests, wildlife and minerals on which multiple sectors are dependent. Water levels in lakes are fluctuating, water quality of lakes, rivers and wetlands is deteriorating, and riparian areas, wetlands and forests are being encroached on. The county intends to follow best practices for Integrated Watershed Management and eco-tourism and alternative tree farming is being promoted.
	Kwale CIDP (2013-2017)	Programmes include developing a mineral resources map, gazette mineral deposits, land accessions, enabling policy for environmental protection, environmental education, demarcation of protected areas, develop tree growers' initiatives, rehabilitate degraded land.
	Kilifi CIDP (2018-2022)	Programmes include improved governance, forest resource conservation and management, wildlife and sensitive ecosystem conservation and waste management. A flagship project is the water to energy project.
	Mombasa CIDP (2018-2022)	Natural resources are overutilized and degraded. Programmes to improve this are development of disposal sites and waste management equipment, rehabilitation of quarries, management of hazardous waste and improved governance.
Tana	Nyeri CIDP (2018-2022)	Programmes include environmental protection and conservation (i.e. reforestation).
	Murang'a CIDP (2018-2022)	Programmes include environmental management and protection (i.e. solid waste management, noise and air pollution control), natural resources conservation and management (i.e. forest conservation, water and catchment area protection) and climate change resilience.
	Kiambu CIDP (2018-2022)	Programmes include promoting a clean environment through county environmental monitoring and management, enabling policy, solid waste management and environmental education. To increase forest cover and for sustainable management of natural resources programmes include forest conservation and management to increase forest cover to 20%, map cover, relocate people, wildlife conservation and security, reclaiming quarry sites.

Basin	County	Natural Resources
	Kirinyaga CIDP (2018-2022)	Programmes include solid waste management.
	Embu CIDP (2018-2017)	Programmes include promotion of sustainable management and utilisation of natural resources through the preparation of environmental management plans for 2 sand harvesting societies and 2 quarrying societies and 1 mining societies annually and rehabilitation of disused quarries.
	Tharaka-Nithi CIDP (2018-2022)	Programmes include afforestation, solid waste disposal and management, climate change, natural resources exploration and exploitation. Flagship projects include establishing a Geographical Information System Laboratory.
	Meru CIDP (2018-2022)	Programmes include rehabilitation of catchment riparian areas, forest ecosystem management, freshwater and wetland ecosystem access availability, waste management and pollution control. Flagship projects include efforts to rehabilitate riparian areas by planting bamboo.
	Isiolo CIDP (2018-2022)	Programmes include climate change mitigation and adaptation, solid waste management, environmental conservation (i.e. enhancing ecosystem productivity and sustainability) and environmental conservation (i.e. reducing desertification).
	Garissa CIDP (2018-2022)	Programmes include environmental management systems, management, conservation and sustainable utilisation of forests, restoration of degraded sites and management of invasive species (i.e. *prosopis julifora*), promote sustainable exploitation of mineral resources, strengthening community conservancies and support of national reserves.
	Tana River CIDP (2018-2022)	Programmes include renewable energy, forest management and development, wildlife management, solid waste management, environmental laws and policies (i.e. enforcement and surveillance), and climate change mitigation.
	Kitui CIDP (2018-2022)	Programmes include waste management, environmental management and awareness, tree growing and forest conservation, climate change adaption and mitigation, water catchment conservation and rehabilitation.
	Machakos CIDP (2018-2022)	Programmes include enabling policy, catchment rehabilitation, tree planting, alternative energy sources, awareness on rain water harvesting, rehabilitation of degraded rivers, solid waste management.
	Kilifi CIDP (2018-2022)	Programmes include improved governance, forest resource conservation and management, wildlife and sensitive ecosystem conservation and waste management. A flagship project is the water to energy project.
	Lamu CIDP (2018-2022)	Programmes include pollution control and regulation (i.e. noise and air pollution, surface, ground and sea water pollution control), natural resources conservation and management.
	Nyeri CIDP (2018-2022)	Programmes include environmental protection and conservation (i.e. reforestation).
LVS	Kisumu CIDP (2018-2022)	Programmes include solid waste management, afforestation initiatives, conservation and rehabilitation of degraded landscapes, noise and air pollution control, strengthening environmental governance, climate change mitigation and adaptation, promoting renewable energy.
	Kericho CIDP (2018-2022)	Programmes include solid waste management, environmental management and protection (i.e. safe removal and disposal of asbestos, waste water management, sustainable forest management.

Basin	County	Natural Resources
	Vihiga CIDP (2018-2022)	Programmes include protection and restoration of indigenous trees, soil management, climate change adaptation and mitigation and the reclamation of degraded land.
	Siaya CIDP (2018-2022)	Considerable environmental degradation has taken place in the county, particularly in Lake Victoria. Water levels have reduced, and soil erosion is taking place, resulting in the silting up of wetlands, dams and water pans. Additionally, river banks, arable farmland and forests have been destroyed. This has resulted in the decline in agricultural and fisheries production in the county. The CIDP aims to promote environmental conservation and embrace measures to green the economy.
	Kisii CIDP (2018-2022)	Programmes include spring protection, energy services (i.e. biogas promotion, energy savings Jikos), environmental management (i.e. rehabilitation services, recreational services, river cleaning services, afforestation services, land reclamation, solid waste management, climate change mitigation, natural resources management).
	Nyamira CIDP (2018-2022)	Programmes include land use management and soil fertility, spring protection, environmental protection (i.e. solid waste management and afforestation).
	Homa Bay CIDP (2018-2022)	Programmes include environmental protection and natural resources management services (i.e. waste management services, afforestation, climate change adaption services).
	Migori CIDP (2018-2022)	Programmes include solid waste management, disaster management (i.e. drought and flood management, fire response services), afforestation, climate change adaption and mitigation and energy services (i.e. the expansion of Gogo Dam for hydropower). Flagship projects include the County Afforestation Programme.
	Nandi CIDP (2018-2022)	The county intends to create policies to protect the environment. Environmentally sensitive areas will be mapped, and development of these areas will be prohibited. Degraded wetlands and river banks will be restored. Communities will be sensitised and made aware of these areas. Public open spaces that have been 'land grabbed' will be repossessed and developed. Sustainable liquid and solid waste disposal systems will be promoted. All buildings will meet energy efficient criteria (solar heating systems and roof water harvesting), and other forms of green energy will be encouraged. Climate change considerations will be included in all county policies and plans.
	Bomet CIDP (2018-2022)	Programmes include environmental conservation and natural resources management (i.e. soil and water conservation, riparian protection, forestry management, solid waste management, environmental education and awareness). Flagship projects include the rehabilitation of Chepalungu Forest.
	Narok CIDP (2018-2022)	Programmes include afforestation and climate change mitigation and adaptation.
	Nakuru CIDP (2018-2022)	Programmes include pollution control, solid waste management, climate change management, regulation and protection of riparian land, environmental resource management and promotion of renewable energy sources.
LVN	Bungoma CIDP (2018-2022)	Sector priorities are to increase agricultural production and productivity; increase access to critical farm inputs (including access to water and irrigation), improve agricultural markets and value addition; and strengthen institutional capacity.

Basin	County	Natural Resources
	Busia CIDP (2018-2022)	Agriculture will be modernised by the development of Agriculture and Extension Policy; development of Land Use Policy; increasing investment in irrigation agriculture, crops and livestock diversification and the maintenance of indigenous genetic seed banks. Rain fed agriculture areas with growth potential were identified as Teso South, Teso North and Nambale. Areas of irrigated agriculture and livestock were identified as Samia, the Bunyala Matayos “Blue economy” and Bunyala.
	Kakamega CIDP (2018-2022)	Programmes include: improving agricultural extension services as well as research and training; promotion of climate smart agricultural practices; livestock development; increasing area of land under irrigation; increasing fish productivity and production; and increasing crop production and productivity;
	Trans Nzoia CIDP (2018-2022)	Programmes include land, soil and water conservation, promotion of climate smart agriculture, capacity building, increasing agricultural productivity and profitability, livestock productivity improvement including livestock disease control, promotion of fisheries, promotion of crop diversification, and the establishment of model farms and an Agricultural Training Centre.
	Uasin Gishu CIDP (2018-2022)	Investing in increased agricultural production and productivity will ensure food security and improved nutritional status for the residents of the county. Programmes to achieve this include increasing livestock, crop and fish production and by adding value to agricultural products. Extension services will be improved, post-harvest management will be supported through provision of adequate storage facilities and driers, farm inputs (e.g. seeds, fertilizers and artificial insemination) will be subsidised, especially for small scale farmers, livestock disease will be controlled, irrigation and greenhouse farming will be initiated, agriculture will be mechanized, and fish farming will be promoted.
	Nandi CIDP (2018-2022)	Agriculture is a vital source of income for households and the county; and is a priority for economic empowerment in the county. The goal for the sector is to increase food and nutritional security, commercialisation of agriculture, and effective and efficient marketing systems in the sector. This will be achieved through crop and livestock development, increased access to irrigation, soil and water conservation, and increased agricultural extension and training. Flagship projects planned for implementation throughout the county include the installation of a milk processing plant, a maize milling plant, a coffee milling plant, soil fertility management, poultry hatcheries and artificial insemination services and milk coolers. A category B slaughterhouse will be constructed at Kapsabet, heifer development and a seed multiplication centre will be established at Kaimosi and Kimwani, and the Kaimosi ATC will be revamped, and a seedling nursery, animal feed mill and a Farm Demonstration Unit will be established there.
	Siaya CIDP (2013-2017)	Programmes to improve and grow agriculture include expanding the extension services, increasing the land under irrigation, increasing the quality and quantity of farm produce, improving storage of farm produce, enhancing livestock disease control, improving access to markets, making fish stocks more sustainable, improving storage of harvested fish, making credit more available to farmers. Flagship projects applying to the whole county include subsidising farm inputs and implementing the multi strategic food reserve. Flagship projects located in Siaya are: a mechanisation project, and the modernisation of the Siaya Agricultural Training College.

Basin	County	Natural Resources
	Vihiga CIDP (2018-2022)	Programmes to improve agriculture include improving crop, livestock and fish production and productivity through increased support services, farmer inputs, marketing and value addition and post-harvest management; and the development of co-operatives. Flagship projects are: the upgrading of Mwitoko fish Farm in Luanda; banana value chain development and commercialisation; and county subsidies for farm inputs such as fertiliser and certified seeds.
	Elgeyo Marakwet CIDP (2018-2022)	Programmes include crop development, agricultural extension and training services, sustainable land management, irrigation, livestock development, trade and industry development, cooperative development, veterinary services, tourism development, and trade and industry development.
RV	Turkana CIDP (2013-2017)	Programmes include catchment conservation, soil and water conservation, afforestation, management of alien invasive species, renewable energy, mineral, oil and gas exploration.
	West Pokot CIDP (2018-2022)	Programmes include forest conservation and management, climate change adaption and mitigation, environmental and wildlife conservation and land reclamation.
	Marsabit CIDP (2018-2022)	Programmes include protection and restoration of water towers, soil management, climate change adaptation and mitigation, protection and conservation of forests, dryland and farm tree planting, promotion of alternative energy, protection of wildlife corridors and buffer zones and rangeland restoration.
	Baringo CIDP (2018-2022)	Programmes include environmental conservation and management (i.e. solid waste management, river bank, wetland and spring protection), natural resource conservation, exploitation and management (i.e. forest conservation, catchment protection, soil and water conservation, renewable energy development, mining and quarrying development, climate change adaptation and mitigation and wildlife conservation and management).
	Nakuru CIDP (2018-2022)	Programmes include pollution control, solid waste management, climate change management, regulation and protection of riparian land, environmental resource management and promotion of renewable energy sources.
	Narok CIDP (2018-2022)	Programmes include afforestation and climate change mitigation and adaptation.
	Kajiado CIDP (2018-2022)	Programmes include policy development, climate change training, solid waste and pollution control, forest and riparian area restoration and rehabilitation of quarries.
	Elgeyo Marakwet CIDP (2018-2022)	Programmes include sustainable land management and conservation of the environment, wetland conservation, conservation of water catchment areas, mainstreaming of climate change actions, tourism development, Rimoi National Reserve development, and culture and heritage preservation, promotion of alternative energy sources, and improved solid waste management.
	Nyandarua CIDP (2018-2022)	Programmes include establishing a county Environmental Committee, solid waste management, wastewater management and creating public awareness on environmental issues.

Basin	County	Natural Resources
	Samburu CIDP (2018-2022)	Programmes include solid waste management, water catchment protection and management (i.e. protection of riverine ecosystems along rivers and within Ndoto, Nyiri and Kirisia catchments, protection of key wetlands and springs), sustainable forest management, environmental planning and management. Sustainable land management is promoted through programmes such as rangelands management and soil conservation and management.
ENN	Laikipia CIDP (2018-2022)	Programmes include solid waste management, human-wildlife conflict prevention, natural resource management (i.e. enhanced ecological services), climate change mitigation and adaptation (i.e. policy and reforestation), integrated rangeland management, water development, environment and natural resources (i.e. climate smart technologies, rain water harvesting, green technologies).
	Samburu CIDP (2018-2022)	Programmes include solid waste management, water catchment protection and management (i.e. protection of riverine ecosystems along Ewaso Ng'iro River and within Ndoto, Nyiri and Kirisia catchments, protection of key wetlands and springs), sustainable forest management, environmental planning and management. Sustainable land management is promoted through programmes such as rangelands management and soil conservation and management.
	Marsabit CIDP (2018-2022)	Programmes include protection and restoration of water towers, soil management, climate change adaptation and mitigation, protection and conservation of forests, dryland and farm tree planting, promotion of alternative energy, protection of wildlife corridors and buffer zones and rangeland restoration.
	Meru CIDP (2018-2022)	Programmes include rehabilitation of catchment riparian areas, forest ecosystem management, freshwater and wetland ecosystem access availability, waste management and pollution control. Flagship projects include efforts to rehabilitate riparian areas by planting bamboo.
	Isiolo CIDP (2018-2022)	Programmes include climate change mitigation and adaptation, solid waste management, environmental conservation (i.e. enhancing ecosystem productivity and sustainability) and environmental conservation (i.e. reducing desertification).
	Garissa CIDP (2018-2022)	Programmes include environmental management systems, management, conservation and sustainable utilization of forests, restoration of degraded sites and management of invasive species (i.e. *prosopis julifora*), promote sustainable exploitation of mineral resources, strengthen community conservancies and support of national reserves.
	Wajir CIDP (2018-2022)	Programmes include climate change mitigation and adaptation (i.e. reforestation), environmental protection and conservation (i.e. reforestation, soil conservation and solid waste management). Flagship programmes include establishing a biogas plant at the county abattoir and a county-wide afforestation programme.
	Mandera CIDP (2018-2022)	Programmes include afforestation and climate change mitigation and adaptation

4 Key Strategic Areas

4.1 Introduction

To comprehensively and systematically address the range of water resources related issues and challenges in the basins and to unlock the value of water as it relates to socio-economic development, 10 Key Strategic Areas (KSAs) were formulated as part of each Basin Plan as presented in Table 4-1. The key aim of these KSAs is to provide a clear way forward for the integrated management and development of the water resources of the basins as a pathway towards a future which achieves a sustainable balance between utilisation and development of water resources and the protection of the natural environment, i.e. minimising environmental and social impacts and maximising socio-economic benefits, taking into consideration the availability of water.

Table 4-1: Key Strategic Areas and Objectives

Key Strategic Area		Strategic Objective
1	Catchment Management	To ensure integrated and sustainable water, land and natural resources management practices
2	Water Resources Protection	To protect and restore the quality and quantity of water resources of the basin using structural and non-structural measures
3	Groundwater Management	The integrated and rational management and development of groundwater resources.
4	Water Quality Management	Efficient and effective management of water quality to ensure that water user requirements are protected in order to promote sustainable socio-economic development in the basin
5	Climate Change Adaptation	To implement climate change mitigation measures in the water resources sector and to ensure water resource development and management are adapted and resilient to the effects of climate change.
6	Flood and Drought Management	To establish and guide a structured programme of actions aimed at ensuring the prevention of, mitigation of, timeous response to, and recovery from, the harmful impacts of floods and droughts across the Basin or specific catchment area.
7	Hydromet Monitoring	An operational and well-maintained hydromet network supported by effective and functional data management and information management systems
8	Water Resources Development	To develop water resources as a key driver for sustainable economic and social development
9	Strengthened Institutional frameworks	To achieve an appropriate balance between operational functionality and the need for effective oversight and governance.
10	Enabling environment	To enhance human and institutional capacities for sustainable management of the water, land, ecosystems and related resources

Strategies and themes which are relevant to the **biodiversity, protected areas and tourism** sectors under each KSA are presented below. (The Basin Plans provide a comprehensive list of all themes and strategies under each KSA.)

Implementation Plans for the KSAs constitute the next step towards implementation of the strategies and themes under each KSA and are discussed in Section 5.

4.2 Catchment Management

4.2.1 Introduction

Water resources degradation is intimately linked to land degradation and influenced by various catchment management and land use factors. Implementing effective catchment management therefore requires a bigger picture perspective and an understanding of the role of natural resource use within a water resources context. People, animals and plants constitute those components of a catchment that make use of the physical resources of land and water. Misuse of these resource elements will therefore lead to unstable natural and social systems, often resulting in further land and water degradation. Integrated catchment management acknowledges the relationships between households, villages, communities and the broader catchment and envisages that individuals take ownership of their role in catchment management - as opposed to a top-down approach lead by legislation and regulations. This is the cornerstone of Integrated Water Resources Management. A key issue in many catchments in Kenya relates to the influence of population pressures on the existing landscape-biodiversity dynamics. With an increasing demand for natural resources and under the influence of historic-political and socio-economic drivers, the human footprint has pushed many natural systems beyond a stable threshold. Any disruption to the natural system impacts the human population, more so in rural areas where communities still live and work very closely to the natural environment.

The objective of Catchment Management is to enable communities, county governments and other relevant governing bodies and institutions to implement integrated catchment management interventions through increased knowledge. As water is the common link among resource users in a catchment, it is appropriate that the catchment is used as a planning unit for resource management. Integrated catchment management is aimed at deriving the greatest possible mix of sustainable benefits for future generations and the communities in a catchment, whilst protecting the natural resources upon which these communities rely. This approach seeks to maintain a balance between the competing pressures exerted by the need to maintain natural resources in the long-term, against the need for continuous economic growth and use of these resources.

4.2.2 Strategy

Catchment Management is important for the **biodiversity, protected areas and tourism sectors**. In order to comprehensively and systematically address the Catchment Management issues and challenges in the basins, the table below presents specific Themes and Strategies under Catchment Management which are critical for the biodiversity, protected areas and tourism sectors.

Table 4-2: Strategic Framework - Catchment Management

1	**Key Strategic Area:**	**Catchment Management**
1.1	**Theme:**	**Promote improved and sustainable catchment management**
1.1.1	Promote sustainable land development and planning	
NEMA Environmental Sustainability Guidelines for Ministries, Departments and Agencies (MDAs) defines sustainability as meaning "meeting the needs of the present without compromising the ability of future generations to meet their own needs". Sustainability is defined as not being an end goal, but rather a journey that MDAs should take to improve the social equity, environmental, and economic conditions in their jurisdiction. In order to reduce the degradation of land and water resources, a sustainable management approach must be implemented. It is important that resource management activities not only apply to new activities, but rehabilitation of degraded resources is critical in order to ensure sustainable management of ecosystem functions and availability of resources for future generations. Degradation of resources will continue if no action is implemented and resources will be further depleted. MDAs should explore the environmental issues within their operations, develop appropriate interventions and document the same in the form of an environmental sustainability policy.		
1.1.2	Strengthen participatory approaches	
The National Environment Policy (Government of Kenya, 2013a) guiding principles emphasises the inclusion of communities in decision making. These participatory approaches need to be strengthened for sustainable catchment management as communities are closely connected with resources in a catchment. Communities need to take ownership of catchment management activities, and this can be achieved through participatory processes through SCMPs, agricultural extension services and CIDPs. The aim of SCMPs is to plan the activities of the sub-catchment in an efficient and sustainable manner to achieve optimum benefits for all in the sub-catchment, through making use of available resources in a sustainable and efficient manner. The process and purpose of a SCMP is to empower the people of the sub-catchment to make decisions and take responsibility for and promote the collective action for the rehabilitation, sustainable management and utilisation of their natural resources. The SCMP is developed by the community of the sub-catchment, for the community of the sub-catchment. The SCMP addresses the resources available to the village community and their needs. Agricultural extension officers and Farmers Field Schools from the AFFA need to be aware of the SCMPs and ensure that catchment management activities fit in with this plan. County Governments are also required to consider the SCMPs in the CIDPs. Appropriate catchment management activities should be considered from theme 1.2. to 1.4.		
1.3	**Theme:**	**Natural resources management for the protection and sustainable use of natural resources**
1.3.1	Improved wetlands and lake management	
According to the CMS's wetlands are under pressure from human encroachment for settlement, expansion of crop production, urbanization, property development and livestock grazing. These wetlands need protection from degradation and restoration of their functional capacities. Although significant wetlands are protected from use (refer to KSA 2), in certain cases seasonal wetlands are utilized by surrounding communities. It is important to not only conserve what is existing, but also improve the farming practices and grazing in wetlands for more sustainable utilisation and reduced impacts (Braid & Lodenkemper, 2019). 1. **Wetland conservation** 2. **Wetland rehabilitation** 3. **Sustainable utilization of wetlands**		
1.3.2	Promote alternative/sustainable livelihoods	

1	Key Strategic Area:	Catchment Management
Communities rely on natural resources to live and earn an income. Over utilisation leads to the depletion of natural resources. Natural resources need to be managed and utilised in a sustainable manner, to maximise the goods and services received from them, while still maintaining their function and production capacity. Natural forests, grasslands and wetlands are finite resources that must be managed sustainably; similarly, alien vegetation can provide useful resources but needs to be managed to prevent uncontrollable spread.		
1.3.4	Improved forestry management	
Forests are important to return moisture to the air through evapotranspiration, which then generates rain, as well as to stabilise soils with their root systems; they can also be rich in terms of biodiversity as well as stores of carbon. Sustainable management of forests both natural and plantation, for reforesting of areas where forests have been removed including the selection of beneficial tree species. The Vision 2030 requires the country to work towards achieving a forest cover of at least 10% of the land area to ensure sustainable resource use, growth and employment creation. The National Forest Policy (Ministry of Environment and Natural Resources, 2014) indicates that the sustainable management of forests includes: • Indigenous forests • Plantation forests • Dryland forests • Urban forests and roadside tree planting • Farm forestry To achieve the national forest cover target of 10% of land area, the major afforestation effort will have to be in community and private lands. Dryland forests offer great potential for intensified afforestation but woody vegetation in the arid and semi-arid areas are unique and require special attention. Most CIDPs promote reforestation through agroforestry, and in some cases water catchment areas are being protected through the use of alien trees (i.e. eucalyptus). Consideration needs to be made to the objective of these programmes as there could be significant long-term challenges associated with planting trees with high water requirements in counties with limited water supply.		
1.3.5	Removal of alien invasive species	
Community knowledge base on how to sustainably manage invasive and alien species should be strengthened. This is because there is knowledge but not strong understanding on the general approaches to sustainably manage invasive and alien plant species. The KFS and KWTA need to consider alien invasive vegetation management as invasive alien plant species are a threat to water resources and water availability. By managing them and preventing their further spread, these plants can also provide useful resources and alternatives to rapidly depleting indigenous vegetation. 1. **Controlling alien invasive vegetation** 2. **Utilising and controlling blue gum (eucalyptus) trees** 3. **Utilising and controlling pine trees** 4. **Utilising and controlling Bamboo** 5. **Utilising and controlling Prosopis species** 6. **Utilising and controlling water weed/hyacinth**		
1.3.6	Improved fisheries management	
Promote the sustainable development and management of fisheries in lakes, dams, wetlands and rivers.		
1.4	**Theme:**	**Rehabilitation of degraded environments**
1.4.1	Rehabilitation and Restoration Plan	
Develop a restoration and rehabilitation programme. Also refer to Strategy 1.2.2.		

1	Key Strategic Area:	Catchment Management
1.4.2	Land restoration and rehabilitation of specific priority areas	
Implement restoration and rehabilitation programme.		
1.4.3	Site specific rehabilitation of degraded riparian areas	
Rehabilitation planning, implementation and associated management is a long-term commitment to a natural resource. The successful rehabilitation of freshwater ecosystems, and thus the overall resilience and sustainability of the system, can only be achieved through engagement of all the stakeholders reliant on the natural capital. Through the Reserve (refer to KSA 2) process studies should be conducted to delineate riparian areas of significant water resources. These studies are required to understand the riparian functioning so that an effective rehabilitation strategy can be developed. The level and type of rehabilitation adopted is case/site specific, as rehabilitation planning is largely dependent on the extent and duration of historical and current disturbances, the cultural landscape in which the ecosystem is located and the opportunities available for rehabilitation. Understanding the overall functioning of the system, particularly in a landscape where the community is dependent on the natural resource, is key for the success of any rehabilitation project. This is further supported by ensuring that an adaptive management approach is incorporated into the planning and aftercare of the system, thus ensuring the ecosystem is maintained at a desirable level and offering it resilience to stressors.		
1.4.4	Site specific rehabilitation of degraded wetlands	
Prioritize wetlands in need of rehabilitation. Once these have been prioritised, rehabilitation and restoration plans should be developed, that will result in increased natural vegetation cover. Local CBOs and NGOs should be involved in this process.		
1.4.5	Site specific rehabilitation of Gazetted forests or protected forests that have been degraded	
Gazetted forests or protected forests that have been degraded need to have new trees planted in order to meet the Kenya Vision 2030. When KFS engage in re-planting trees, it should be done considering appropriate soil and water conservation techniques and beneficial/natural trees as a part of an integrated catchment management approach. According to the CMS's several forest reserves have had significant vegetation cover loss or are under threat of encroachment. There was also a high probability of significant decline of the mangrove along the Indian Ocean Coast between 2001 and 2013. The CIDPs have promoted tree planting for agroforestry, woodlots for alternative energy and provided education about the detrimental effects of deforestation for communities and the environment.		

4.3 Water Resources Protection

4.3.1 Introduction

Water is critical to social and economic development but also supports key ecological systems which underpin human wellbeing and provides essential ecosystem goods and services. According to the Kenya Water Act (2016), a water resource is defined as *"any lake, pond, swamp, marsh, stream, watercourse, estuary, aquifer, artesian basin or other body of flowing or standing water, whether above or below the ground, and includes sea water and transboundary waters within the territorial jurisdiction of Kenya*". It is important to differentiate between surface and groundwater resources as these are treated differently within the context of water resources protection: surface water resources include rivers (i.e. stream, watercourse), wetlands (i.e. lakes, ponds, swamp, marsh, spring) and estuaries, while groundwater resources refer to aquifers and artesian basins.

The 2016 Water Act also outlines the designation of Basin areas, with functions of Basin Water Resource Committees (BWRCs) within each Basin clearly stated. Furthermore, the Act defines the establishment and functions of Water Resource Users Associations (WRUAs) i.e. associations of water resource users at the sub-basin level in accordance with Regulations prescribed by the Authority. These

associations are community based for collaborative management of water resources and resolution of conflicts concerning the use of water resources.

Protection of water resources in Kenya therefore starts at the National level with the WRA developing policies and legislation for protection of water resources. BWRCs then enact these measures to fulfil the water resource quality objectives for each class of water resource in a basin and need to put in place measures for sustainable management of the water resources; whilst at the sub-basin level more local level community-based management occurs through WRUAs.

4.3.2 Strategy

Water Resource Protection is important for the **biodiversity, protected areas and tourism sectors**. In order to comprehensively and systematically address the Water Resource Protection issues and challenges in the basins, the table below presents specific Themes and Strategies under Water Resource Protection which are critical for the biodiversity, protected areas and tourism sectors.

Table 4-3: Strategic Framework - Water Resources Protection

2	**Key Strategic Area:**	**Water Resources Protection**
2.1	**Theme:**	**Classification of water resources**
2.1.1	Determine the baseline for Resource Directed Measures: Surface and groundwater assessments at appropriate scales to inform the classification of water resources in the basin.	
Water Quality and Quantity assessments are required in order to set a baseline for Resource Directed Measures. This baseline will inform the classification and resource quality objectives for the significant water resources in the basins.		
2.1.2	Determine Class of water resources	
Determining the Class of a water resource is the first step in the Water Resource Management cycle. A vision for the desired future state of water resources results in Ecological Categories for water resources based on the level of protection or increasing levels of risk. Ultimately the determined Class of a resource will determine the Reserve and associated Resource Quality Objectives that are set to achieve it.		
2.2	**Theme:**	**Ecological Reserve**
2.2.1	Reserve determination	
In order to protect the water resources of the basins the environmental Reserve needs to be determined. The total water resource (surface and groundwater) is made up of what is available for allocation or use and the Reserve. The Reserve (in terms of quantity and quality) is made up of what is needed to satisfy the basic human needs of people who are or may be supplied from the water resource (i.e. Basic Human Needs) and what is needed to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the water resource (i.e. Ecological Reserve). The water requirements of the ecosystem must therefore be met before any allocation may be made. This forms part of the Water Resource Management cycle which is an adaptive management approach focused on goal-setting. Once the environmental reserve is defined then the resource quality objectives can be determined for priority water resources.		
2.2.2	Reserve compliance	
Water Quantity is a key driver of water resources therefore its management is critical in the maintenance of ecosystems and for the provision of water for socio-economic purposes. Once the environmental reserve has been set then the flows required to maintain the reserve need to be managed. Implementing the operating rules to ensure that the releases from infrastructure required by users and the ecology are met in time and at EWR site. This may consist of the operation of dams, abstractions and other infrastructure as well as management through licensing and implementation of restrictions. Compliance hydrological monitoring is required, based largely on the continuous monitoring at a network of flow and water level gauges. Compliance monitoring is also required, based on monitoring low flows and water levels at gauging weirs and boreholes.		
2.3	**Theme:**	**Determine Resource Quality Objectives**

2	**Key Strategic Area:**	**Water Resources Protection**
2.3.1	Set Resource Quality Objectives	
Determine the Resource Quality Objectives for prioritised water resources in the basins.		
2.4	**Theme:**	**Conservation and protection of ecological infrastructure**
2.4.1	Integrate environmental considerations into basin development and planning	
Water is critical to social and economic development but is also a critical component in supporting key ecological systems which underpin human wellbeing as well as providing essential ecosystem goods and services. A strategic social and environmental assessment is therefore an important component of the Classification of the basins water resources. The Classification of water resources requires a balance between social and environmental considerations.		
2.4.2	Groundwater protection	
Rehabilitate polluted aquifers, springs and wells as part of Catchment Management Plan. Groundwater source protection zones defined by WRA and gazetted under Water Act 2016.		
2.4.3	Riparian areas protection	
Riparian areas, as defined by WRA, gazetted under Water Act 2002 and WRM Regulations 2007, currently under amendment by Attorney General in accordance with revised definition agreed on at sixteenth meeting held on 2 June 2020 by the National Development Implementation and Communication Cabinet Committee.		
2.4.4	Ecosystem services protection	
Water is critical to social and economic development but is also a critical component in supporting key ecological systems which underpin human wellbeing as well as providing essential ecosystem goods and services. In particular, certain environmentally sensitive areas are reliant on the protection of water resources. Although environmentally sensitive areas are defined by NEMA, this information should be provided to WRA during the Classification of water resources in order for WRA to classify and protect according to the Water Act 2016.		

4.4 Groundwater Management

4.4.1 Introduction

Groundwater has provided and will continue to provide much of the water needed for livelihoods and development for many communities and industries in Kenya. Numerous rural communities and small towns across the Republic depend on groundwater from boreholes and shallow wells for their domestic and livestock needs, and to support other economic activities. Spring flow and baseflow contribute significantly to maintaining streamflow, particularly during dry seasons. Groundwater management is known to be one of the most important, least recognised and highly complex of natural resource challenges facing society (Foster, 2000).

Groundwater in Kenya is currently not managed in a coherent fashion (Mumma et al., 2011). A final Final Draft National Policy on Groundwater Resources Development and Management was published in 2013 (Ministry of Water and Irrigation, 2013), but despite the best of intentions, groundwater remains poorly understood and poorly managed. The policy document highlights a number of specific issues:

- Availability and vulnerability of groundwater resources in Kenya are poorly understood
- Institutional arrangements for groundwater management in Kenya, including management capacity and financing are weak

- Very limited integrated water resources management in Kenya, with groundwater and surface water typically being treated as separate water resources
- Very limited groundwater quality management in Kenya

In addition to the National Policy on Groundwater Resources Development and Management, the National Water Quality Management Strategy (Ministry of Water and Irrigation, 2012) addresses groundwater protection in S. 2.7. It recommended the "Development of Ground Water Protection programs" without defining or describing them. The NWQMS lays out the following "strategic responses":

- Extraction of groundwater at sustainable rates to avoid seawater intrusion.
- Intensifying groundwater quality monitoring by sinking observation boreholes.
- Establishing a monitoring program for selected production wells to capture any changing trends.
- Requiring all borehole owners to have their water tested periodically as part of the water quality monitoring programme.
- Maintain updated database of borehole data.

A groundwater management strategy is influenced by hydrogeological, socio-economic and political factors and is informed by both policy and strategy. This Groundwater Management Plan is necessary for the integrated and rational management and development of groundwater resources in the Tana Basin. It aims to capture and integrate a basic groundwater understanding, describes sustainable management measures and presents an action plan with clear objectives and desired outcomes. It also estimates the financial requirements needed for implementation and the timeframe for its implementation. It is not a static instrument. As resources monitoring and data analysis takes place across the planning period, improvements and even whole new aspects may need to be incorporated.

The key objectives of the Plan include:

- Conserve the overall groundwater resource base and protect its quality
- Recognise and resolve local conflicts over resource allocation (abstraction or pollution)

Note: *A Groundwater Management Plan needs to be differentiated from an Aquifer Management Plan: the former considers groundwater management from a Basin perspective, while an Aquifer Management Plan is applied to a single aquifer unit.*

4.4.2 Strategy

Although groundwater plays a significant role in maintenance of streamflow and as a source of potable water in remote areas, it is not considered a priority KSA for the **biodiversity, protected areas and tourism sectors**.

4.5 Water Quality Management

4.5.1 Introduction

Water quality is the physical, chemical, biological and aesthetic properties of water that determine its fitness for its intended use, and that are necessary for protecting the health of aquatic ecosystems.

Water quality management is the maintenance of the fitness for use of surface and groundwater resources, on a sustainable basis, by achieving a balance between socio-economic development and water resources protection. Fitness for use is an evaluation of how suitable water is for its intended purpose (e.g. domestic, agricultural or industrial water supply) or for protecting the health of aquatic ecosystems. The fitness for use evaluation is based on scientific evidence in the form of water quality guidelines or standards for different water uses (e.g. drinking water standards). The business of water

quality management is the ongoing process of planning, development, implementation and administration of Kenyan water quality management policies, the authorisation of water uses that impact on water quality, and monitoring and auditing all these activities.

This section provides an introduction of the key water pollutants responsible for the deterioration of water quality in the basin, the point and non-point sources associated with the pollutants, and overview of the water quality status and threats in the basin, and a strategic framework for water quality management in the basins.

4.5.2 Strategy

Water Quality Management important for the **biodiversity, protected areas and tourism sectors**. In order to comprehensively and systematically address the Water Quality Management issues and challenges in the basins, the table below presents specific Themes and Strategies under Water Quality Management which are critical for the biodiversity, protected areas and tourism sectors.

Table 4-4: Strategic Framework - Water Quality Management

4	**Key Strategic Area:**	**Water Quality Management (SW and GW)**
4.2	**Theme:**	**Promote sound water quality management governance in the basins**
With so many institutions involved in different aspects of water quality management in the basins, it is inevitable that there may be uncertainty about the mandate of each institution with respect to water quality management. This objective can be met by clarifying the mandates, the and roles and responsibilities of the different institutions involved in the basins. This can be achieved by reviewing the mandates, and roles and responsibilities of institutions. It is also important that there be effective arrangements between role players with regard to water quality management to ensure that cooperative governance of water quality is achieved. This can be accomplished by establishing mechanisms for cooperation between government institutions on water quality management and pollution control issues. Two strategies have been identified to help alignment, collaboration, and institutional efficiency.		
4.2.1	Harmonise policies and strategies to improved water quality management	
There are a number of institutions involved in different aspects of water quality and pollution management (e.g. WRA, NEMA, MoA, NIB, counties, basin authority, PCPB, etc.). Their policies, strategies and plans are not always aligned because they are responsible for different aspects of water resources management in the basins. WRA should advocate alignment of strategies to serve a common purpose of rehabilitating urban rivers and streams in the basins.		
4.2.2	Coordination and cooperation mechanism on water quality issues established at a catchment level	
WRA should establish a coordination and cooperation mechanism to ensure there is alignment of actions to address water pollution management in the basins. Participate in river clean-up campaigns of rivers. This can be achieved by using the inter-agency task-force to mobilize resources, carry out clean-ups, creating awareness, and where appropriate, demolishing structures in riparian buffers.		
4.3	**Theme:**	**Efficient and effective management of point and nonpoint sources of water pollution**
The water quality challenges in the basins will require efficient and effective management of pollution sources, as well as mitigating the symptoms of pollution in rivers, reservoirs, and lakes. **Point sources** - Monitoring of compliance with Kenyan domestic and industrial effluent standards should be strengthened. All effluent monitoring data should be stored in a central database (Mike Info in this case). Protocols should be implemented for enforcing standards, and for dealing with non-compliant dischargers. To meet this goal, producers of wastewater should be encouraged to treat wastewater at source. This can be achieved by identifying industrial polluters with no wastewater treatment and not meeting effluent standards and directing them to implement onsite wastewater treatment. It can also be achieved by requiring onsite wastewater treatment at all new industries being established. Consideration should also be given to the design and construction of centralised		

4	Key Strategic Area:	Water Quality Management (SW and GW)

WWTWs and sludge treatment facilities for large urban centres, and to progressively connect households and large wastewater producers to the sewerage network. Lastly, the focal areas of the Kenya National Cleaner Production Centre (KNCPC) should be supported, and industries should be encouraged to participate in this initiative.

Nonpoint sources - Nonpoint sources of pollution probably have the greatest impacts on water quality in the basins.

Erosion and sedimentation from agricultural lands is probably a major concern and interventions to manage its impacts should be implemented. It has also been the focus of may soil conservation initiative undertaken in Kenya over many years. Reducing erosion and sedimentation also has a large positive impact on water pollution as many pollutants adhere onto sediment particles, and intercepting the particles before they enter water courses, also prevents these pollutants from entering streams, rivers, and lakes. To meet this objective, a number of target sources have been identified dealing with urban stormwater, riparian buffer strips, hydrocarbon pollution, runoff from informal settlements, other agricultural impacts, and runoff from unpaved roads.

The management of stormwater in urban areas is important because it is the conduit for transporting pollutants into urban streams, and eventually nearby rivers and lakes. This requires promoting the use of structural stormwater control and treatment facilities (e.g. instream detention ponds) in urban areas, as well as reducing stormwater runoff by improved rainfall infiltration systems, efficient drainage network, and improved rainwater harvesting by households, complexes, and commercial buildings. Riparian buffer strips is an important measure to intercepting and filter polluted runoff. The installation and maintenance of riparian buffer zones and vegetated buffer strips should be promoted and enforced. Hydrocarbon pollution from the dumping of used oil into stormwater drains can contaminate large volumes of water rendering it unfit for use. The installation of oil separators at all garages and vehicle workshops should be enforced, and illegal dumping of used oil at informal workshops should be policed and culprits be prosecuted.

Informal settlements have a huge negative impact on urban water quality due to indiscriminate disposal of liquid and solid household wastes.

A number of strategies have been identified to focus management of water pollution.

4.6 Climate Change Adaptation

4.6.1 Introduction

In the face of a changing climate, adaptation and resilience are Africa's and indeed Kenya's priority responses to address vulnerabilities and risks. The 15th African Ministerial Conference on the Environment 2015 strongly promoted investment in building resilience as a top funding priority and an integral part of national development funding. This aligns very well with Kenya's approach of mainstreaming climate adaptation in national and sub-national development planning.

The Kenya National Climate Change Response Strategy (NCCRS) (Government of Kenya, 2010b) acknowledged that the impacts of observed and projected climatic change pose serious threats to sustainable development. These predominantly relate to severe weather and changes in the climate extremes which will reduce the resilience in many sectors of the economy.

The Climate and Development Knowledge Network in their Government of Kenya Adaptation Technical Analysis Risk Report (Government of Kenya, 2012) identified various sectors in Kenya which are at-risk, either directly or indirectly, from climate change. These sectors include agriculture, livestock and fisheries, manufacturing, retail and trade, water, health, financial services, tourism, urban and housing sectors, infrastructure, energy, transport, natural resources and environment, political and social sectors.

The Climate Change Act 2016 aims to strengthen climate change governance coordination structures and outlines the key climate change duties of public and non-state actors. It establishes a high-level

National Climate Change Council chaired by the President, a Climate Change Directorate as the lead technical agency on climate change affairs, and a Climate Change Fund as a financing mechanism for priority climate change actions/interventions. Climate desks/units have subsequently been established in certain line ministries staffed by relevant climate change desk officers. The Act is to be applied across all sectors of the economy, and by both the national and county governments. Mainstreaming of climate change has to some extent been undertaken at the county government level, where some counties have taken measures to include climate change in their County Integrated Development Plans (CIDPs) and to develop relevant county legislation.

The National Climate Change Action Plan (NCCAP) 2013 to 2017 (Government of Kenya, 2013b) sets out a vision for a low carbon development pathway for Kenya and lists specific adaptation and mitigation actions for each national planning sector to support this vision. One of the “big wins” identified in the Final Draft NCCAP 2018-2022 relates to “improved water resources management”.

The Final Draft NCCAP 2018-2022 (Government of Kenya, 2018) builds on the first Action Plan (2013-2017) and provides a framework for Kenya to deliver on its Nationally Determined Contribution (NDC) under the Paris Agreement of the United Nations Framework Convention on Climate Change. The Final Draft NCCAP 2018-2022 guides the climate actions of the national and county governments, the private sector, civil society and other actors as Kenya transitions to a low carbon climate resilient development pathway. It identifies strategic areas where climate action over the next five years is linked to Kenya’s Big Four Agenda, recognising that climate change is likely to limit the achievement of these pillars. One of the “big wins” identified in the Final Draft NCCAP 2018-2022 relates to “improved water resources management”. Of particular relevance to water resources management and planning is “Food and Nutrition Security” where food security may be threatened through climate change-driven declines in agricultural productivity. The Final Draft NCCAP 2018-2022 also prioritises seven climate change actions (Table 4-5), three of which (nos. 1 to 3) align very strongly with the planning and management of water resources.

Table 4-5: Priority climate change actions (Government of Kenya, 2018)

1. Disaster Risk (Floods and Drought) Management	Reduce risks to communities and infrastructure resulting from climate-related disasters such as droughts and floods.
2. Food and Nutrition Security	Increase food and nutrition security through enhanced productivity and resilience of the agricultural sector in as low-carbon a manner as possible.
3. Water and the Blue Economy	Enhance resilience of the water sector by ensuring access to and efficient use of water for agriculture, manufacturing, domestic, wildlife and other uses.
4. Forestry, Wildlife and Tourism	Increase forest cover to 10% of total land area; rehabilitate degraded lands, including rangelands; increase resilience of the wildlife and tourism sector.
5. Health, Sanitation and Human Settlements	Reduce incidence of malaria and other diseases expected to increase because of climate change; promote climate resilient buildings and settlements, including urban centres, ASALs and coastal areas; and encourage climate-resilient solid waste management.
6. Manufacturing	Improve energy and resource efficiency in the manufacturing sector.
7. Energy and Transport	Climate-proof energy and transport infrastructure; promote renewable energy development; increase uptake of clean cooking solutions; and develop sustainable transport systems.

The Kenya NAP 2015 to 2030 (Government of Kenya, 2016) builds on the NCCRS and NCCAP and promotes adaptation as the main priority for Kenya, while also proposing that adaptation and development goals complement each other. Some of the key objectives of the NAP which are applicable to the Basin Plans include understanding the importance of adaptation and resilience building actions

in development; integrating climate change adaptation into national and county level development planning and budgeting processes; and enhancing the resilience of vulnerable populations to climate shocks through adaptation and disaster risk reduction strategies.

Within the context of the Basin Plans, the objective of this component of the Plan is to understand the degree to which climate change will compromise the water resources sector and how those impacts will in turn alter the exposure to food security and to flood and drought risk. This component will also explore opportunities presented by climate change such as climate financing.

4.6.2 Strategy

Climate Change is important for the **biodiversity, protected areas and tourism sectors**. In order to comprehensively and systematically address the Climate Change issues and challenges in the basins, the table below presents specific Themes and Strategies under Climate Change Mitigation, Adaptation and Preparedness which are critical for the biodiversity, protected areas and tourism sectors.

Table 4-6: Strategic Framework - Climate Change Mitigation, Adaptation and Preparedness

5	**Key Strategic Area:**	**Climate Change Adaptation and Preparedness**
5.1	**Theme:**	**Understand impacts of climate change on water resources at appropriate spatial scales**
5.1.1	Quantify climate change impacts (rainfall & temperature) on surface water and groundwater resources and demands in the basins at appropriate scales for planning and management	
This is undertaken though research and public consultation processes, and where necessary, engaging with the private sectors for further insights. As the impacts will be felt in a practical sense, this process should focus more on the in-situ impacts, thresholds and exposer accounts rather than as a technical theoretical review.		
5.1.2	Assess relevance, and scale of potential social, environmental and economic climate change impacts as defined in NCCAP in the basins and its relation to water resources planning and management; prioritise areas for interventions	
This will assess climatic trends to evaluate frequency and magnitude of events resulting in flooding events. Furthermore, the highlighting of hotspot area will act as a pre-emptive measure building resilience. Assessment of meteorological data relative to the ENSO cycle may provide forewarning into future drought occurrence and severity. Furthermore, there should be analysis of rainfall onset and cessation, particularly in rainfed agricultural areas and areas highly reliant on surface water rather than reticulation. Assessment of meteorological data relative to the ENSO cycle may provide forewarning into future drought occurrence and severity. Furthermore, there should be analysis of rainfall onset and cessation, particularly in rainfed agricultural areas and areas highly reliant on surface water rather than reticulation. Engage local private sector, NGOs and knowledgeable individuals to facilitate wider experience transfer of adaptation practices. Engage local private sector, NGOs and knowledgeable individuals to facilitate wider experience transfer of adaptation practices		
5.2	**Theme:**	**Climate change mitigation**
5.2.1	Undertake reforestation	
Promote protection of sensitive areas and ensure that natural systems are not compromised. Prevent slash and burn agriculture. Promote active reforestation initiatives and give education of ecosystem services of forests beyond utilisation as a timber resource.		
5.3	**Theme:**	**Climate change adaptation**
5.3.1	Promote climate resilient infrastructure	
Promote the development in low risk areas and increase setback from rivers and ocean interfaces. Build to increased threshold specifications to address future climate impacts for both road and stormwater infrastructure		
5.3.2	Climate-related disaster risk management	

5	Key Strategic Area:	Climate Change Adaptation and Preparedness
Reduce the risk of disasters linked to climate change e.g. floods, droughts, health-related risks, crop production etc. by understanding the potential threats and risks and by implementing structural and non-structural mitigation measures.		
5.3.4	Promote agroforestry	
Enhance the CO_2 sink by promoting varied land usage to increase biodiversity and minimise soil erosion and increase soil nutrients retention. Actively plant living fences, medicinal and fruit trees.		
5.3.5	Mainstream climate change adaptation in water resources strategy, planning and management at basin and catchment level	
Implementation and enforcement of practical mainstreaming practices and enhance the awareness of potential climate impacts on communities to promote uptake of adaptation.		

4.7 Flood and Drought Management

4.7.1 Introduction

Floods and droughts are caused by extreme climatic events and can have devastating consequences for the socio-economic welfare of rural and urban communities and regions.

Flooding of land surfaces occurs when heavy rainfall leads to runoff volumes that exceed the carrying and storage capacities of stream channels and urban drainage systems. In the process, crop and grazing lands, villages and urban neighbourhoods become inundated, transport infrastructure destroyed, and powerlines flattened. Floods can cause displacement of people, loss of life (human and livestock), increases in water related-diseases, severe soil erosion, land-slides, increased food insecurity and significant losses to the economy of a region.

Drought can be defined as an extended period (consecutive months or years) of unusually low rainfall, depleted soil moisture and groundwater levels and a severe reduction in availability of surface water resources in streams, reservoirs and lakes. Drought can be referred to as a “creeping disaster” since its effects accumulate slowly and may linger for years after the termination of the event. Droughts can decimate dryland crop production, severely curtail irrigated crop production, cause severe loss of life of livestock and game, diminish freshwater fish-stocks, result in severely restricted municipal and industrial water supplies and give rise to substantial losses to the economy of a region.

It follows from the above that systematic preparedness planning for floods and droughts is an imperative to ensure mitigation of and protection against the above negative consequences of extreme floods and droughts.

4.7.2 Strategy

Flood and drought management is important for the broader water sector and is not considered a priority in the **biodiversity, protected areas and tourism sectors**.

4.8 Hydro-meteorological Monitoring

4.8.1 Introduction

An operational and well-maintained hydro-meteorological network is critical to support the WRA with its key functions related to water resources planning, regulation and management in the basins. The WRA is responsible for all aspects related to the monitoring (quantity and quality) of surface and groundwater

in Kenya, including the construction and maintenance of monitoring stations, related equipment, data collection, transmission, capturing and storage, and dissemination.

4.8.2 Strategy

An adequate and efficient hydro-meteorological monitoring network is critical for water resource planning but is not considered a priority in the **biodiversity, protected areas and tourism sectors**.

4.9 Water Resources Development

4.9.1 Introduction

Water resources planning and development relate to large-scale water resources and related infrastructure which will support socio-economic development in the basins to improve water availability and assurance of supply for current and projected future water use in the basin, while taking into consideration environmental sustainability. The rationale for the development of the basin plans was to assess whether the basin's water resources are sufficient to meet the expected growth in water requirements with 2040 as the planning horizon. The approach entailed an evaluation of the need for and the capacity of large-scale water resources development interventions such as dams and transfers, some of which include multi-purpose projects. Most of the interventions which were considered were already identified as part of previous planning studies. Proposed schemes should be implemented in conjunction with management interventions i.e. water conservation and demand management initiatives. Such an approach, in combination with the phased development of new infrastructure, will allow an adaptive development strategy towards improving climate resilience.

4.9.2 Strategy

Water resources development is important for the **biodiversity, protected areas and tourism** sectors. In order to comprehensively and systematically address the Water resources development issues and challenges in the basins, the table below presents specific Themes and Strategies under Water resources development which are critical for the biodiversity, protected areas and tourism sectors.

Table 4-7: Strategic Framework – Water resources development

8. Key Strategic Area		**Water resources development**
8.7	**Theme:**	**Water based tourism and recreation**
8.7.1	Promote water-based tourism and recreation	
Adventure tourism, leisure activities, recreational activities and resorts should be promoted in the vicinity of large dams, especially at dams situated close to major cities.		

4.10 Institutional Strengthening and Enabling Environment

4.10.1 Introduction

In effect, the key aspect of any institutional reform process is to find an appropriate balance between operational functionality and the need for effective oversight and governance. Despite the various efforts that have been targeted at improving the institutional framework in the basins, there still remain challenges that warrant dynamic and progressive approaches to address them. Thus, this Plan provides the opportunity to integrate institutional reforms with the various elements of water resources management and development, noting that these reforms are an important part of ensuring that this Plan is implemented. Whilst, the various technical dimensions of this Plan are of significant importance,

it does need to be highlighted that the ability of institutions to implement, oversee and review approaches accordingly will determine the efficacy of the basin plan.

Noting the variability of the climate and the potential impacts of climate change, the ability of institutions to manage adaptively will become increasingly important. In addition, the importance of the basins in terms of Kenya's socio-economic development cannot be underestimated. This will require strengthened inter-governmental approaches and inter-sectoral partnerships. These will be imperative noting the importance of the water-food-energy nexus, and will need to not only ensure improved levels of inter-sectoral planning, but equally improved effectiveness and efficiency from better implementation alignment as well as coordinated oversight. This is especially important when one notes the ongoing capacity constraints that face most sectors.

Whilst there will be ongoing pressures to develop and use water resources to enable socio-economic growth and development in the basins, the need to ensure that this takes place in a sustainable manner will become increasingly imperative. The shifts towards strengthening the regulatory role of the WRA, aligned to the 2016 Water Act, are important and will have an impact on the institutional roles and responsibilities within the basins. Hence, the drive to enable better coordinated resource development will be balanced by an improvement in the regulatory response by WRA. This will mirror and support the drive at a national level to strengthen catchment-based water resources management.

4.10.2 Strategies

An Enabling Environment is important for the **biodiversity, protected areas and tourism sectors**. In order to comprehensively and systematically address the enabling environment issues and challenges in the basins, Table 4-8 below presents specific Themes and Strategies under Enabling Environment which are critical for the biodiversity, protected areas and tourism sectors.

Table 4-8: Strategic Framework – Enabling environment to support effective water resources planning and management

10	**Key Strategic Area:**	**Enabling environment to support effective water resources planning and management**
10.1	Theme:	Develop institutional capacity
10.1.1	Strengthen policies and regulatory instruments	
Updating WRA's standards, policies and regulations in line with the WA2016 is needed. This should be followed by awareness creation and training and capacity building for the new standards, policies and regulations. Respective tools to support the new legislative instruments should also be developed to aid the implementation phases. Development of these tools should adopt a participatory approach in consultation with major stakeholders to ensure buy in and ownership of the new legislative instruments that will trickle down to implementation.		
10.1.2	Development of technical and management capacity	
Across the institutional framework there is a need to develop a range of technical and managerial skills to improve the institutional ability to deliver on mandate. This includes not only ensuring appropriate levels of staffing, but also the upskilling and training of staff to be able to perform functions to the required technical and managerial levels. This will need to take place in alignment with the ongoing work to clarify institutional roles and responsibilities (see KSA 9) and will look to introduce training opportunities across institutions supported by a basin level capacity building framework. Thus, training interventions will support the ongoing development of a community of practice within the basin and will enable more effective inter-institutional functionality.		
10.1.3	Strengthen partnerships	
The importance of inter-sectoral engagement in water resource management and development has increasingly been recognised. This will support the development of more aligned planning approaches to both management and development, as well as provide additional capacity support when and where appropriate. This could also introduce efficiencies that adjust institutional capacity requirements. To this end, there is a need for the development of a partnership framework that provides the basis for the approach towards partnerships. This will then be implemented through the ongoing development of partnership arrangements over time.		

10	Key Strategic Area:	Enabling environment to support effective water resources planning and management
10.1.4	Strengthen stakeholder engagement	
The importance of stakeholder engagement cannot be over emphasised. The improvement in the development of water resource management and development solutions, the improvement in alignment of operational activities and the development of a sense of ownership of the management regime all provide the basis for more robust and sustainable management. There is a clear understanding that there is a need to improve upon the levels of stakeholder engagement and this cuts across the various institutions that play a role in water resource management and development. In this regard, the development of an agreed upon basin-wide framework for engagement is a key first step, supported then by the implementation of this framework. A key element of this, will include improving the functionality of the existing forum.		
10.1.5	Improved research	
Noting the impacts that climate variability and climate change will have upon the water resources of the Athi basin, together with the need to support ongoing development, there will be an ongoing need to develop innovative solutions to the ongoing challenges of water resource management and development. Research towards finding these innovative approaches and technologies will become increasingly important. Developing the network of supporting research institutions will be an important step together with providing the appropriate communication and engagement channels that enables exchange of information. A key challenge has always been ensuring that the research agenda is supportive of the challenges that the sector is experiencing, and so the need to ensure ongoing exchange is critical.		
10.1.6	Innovative financing	
Ensuring adequate financial resources to support integrated water resources management at the basin level is a significant challenge evidenced by the financial hurdles for catchment-based institutions such as the WRA ROs and SROs, the former CAACs and forums. Embracing innovative internal and external resource mobilisation strategies is needed. This needs to factor in new entities in the sector such as the County Governments and other water sector institutions. The private sector provides opportunities for innovative financing for water resources management and should therefore be explored to complement the budget allocated for water resources management from the national fiscus. Internal and external resource mobilisation strategies will be implemented concurrently because of the very crucial role financing plays as a key enabler for IWRM implementation.		

5 Key outcomes

5.1 Introduction

This section establishes a link between the findings and outcomes of the basin planning process and the effective implementation of the recommended strategies within the framework of IWRM and with specific relevance to biodiversity, protected areas and tourism. It contextualises the basin plans and recommends specific themes and interventions along with cost estimates for implementation of actions related to **biodiversity, protected areas and tourism** in the respective basins.

The links between ecosystem services and human wellbeing have in the past been obscured by national government focus on growing the economy. This has happened not only in Kenya, but worldwide, and has resulted in many cases in short term economic growth at the expense of over-exploitation of natural capital with a consequent decline in biodiversity. Governments have become increasingly aware of this problem and of the need to address it by integrating the value of natural capital into plans for economic growth. The Government of Kenya is fully aware of this and is committed to ensuring that a full and comprehensive valuation of the country's natural capital is undertaken, integrated and mainstreamed into all national socio-economic development processes. This is expected to result, in time, in a shifting of biodiversity conservation initiatives from costly retroactive restoration to cost effective preventative conservation (MEWNR,2015).

It is also recognised that, for preventative conservation to be most effective, responsibility for it needs to be devolved from national level to county and community level, where the benefits of good conservation practices and the serious consequences of bad practices are more visible. This principle is embedded in Vision 2030 and the Constitution of Kenya. In order to comply with this principle, the Environmental Management and Co-ordination Act of 1999 and forestry, fisheries and water management legislation has, or is being, reFinal Drafted to devolve more rights and responsibilities for environmental management and governance to county and local community level (MEWNR,2015). This process has the potential to significantly increase the effectiveness of initiatives to restore and sustain biodiversity.

The main challenges associated with water resources development and management in Kenya vary across the country and include water quality, the spatial and temporal variability of water, assurance of supply, impacts of climate change, the expected growth in water demand linked to population growth and socio-economic and irrigation development, challenges associated with the successful implementation of large-scale water resources and related infrastructure, inadequate planning, etc. These challenges are exacerbated by various management and institutional issues. Furthermore, environmental sustainability needs to form an integral part of the decision-making processes during development of Kenya's water resources.

5.2 Context

Within a global context, the adoption of the United Nations Sustainable Development Goals (SDGs) (UN, 2015) is an opportunity to enact an integrated approach to water resources management. Consequently, the Key Strategic Areas (KSAs) which lie at the heart of the six Basin Plans provide various synergies with the SDGs. Furthermore, it is important to note that the successful implementation of the Basin Plans will depend on the degree to which concurrent and future planning in each basin, at various levels, is aligned with the proposed development plans for the water sector.

5.2.1 Linkages with Basin Plans

The six Basin Plans which were developed as part of KWSCRP-1 are key deliverables toward the overall objective of the KWSCRP, namely to strengthen WRA's capacity in terms of tools, skills and infrastructure to deliver on its mandate for water resources regulation in the country. It constitutes IWRM and Development Plans for the six river basins, which consider the environmental, social and economic aspects of each basin, address the key issues and challenges, and ensure that these aspects are integrated into overall management strategies. The Basin Plans aim to achieve a sustainable balance between the utilisation, development and protection of water resources and provide a clear pathway for the sustainable utilisation and development of the water resources of Kenya. It is also important to remember that the Plans are "living documents", which should accommodate adjustments and/or updates. Ideally the Basin Plan should be reviewed and updated every five years.

The purpose of this Sectoral Integration Plan with regard to the **biodiversity, protected areas and tourism sectors** in Kenya, is to ensure that the key findings and outputs from the six Basin Plans which were developed under KWSCRP-1 are properly integrated at sectoral level - in each of the six basins as well as in the country as a whole.

5.2.2 Linkages with the UN sustainable development goals

Since adoption of the UN 2030 Agenda for Sustainable Development, the Government of Kenya, as a member of the United Nations, has committed to the integration of the SDGs into national and county policy and planning frameworks. The UN 2030 Agenda is based on global sustainable development goals and covers the five critical pillars: people, planet, prosperity, peace and partnerships. It contains 17 goals and 169 targets that provide broad guidelines for sustainable development. The 17 Goals are all interconnected, and the aim is that these should be achieved by 2030. Although SDG 6 is directly related to water, under IWRM all the SDGs are considered important. This six Basin Plans include actions that not only address specific issues associated with each KSA, but also integrate measures to achieve a number of SDGs. The diagram below shows the Integration of the SDGs into the six Basin Plans.

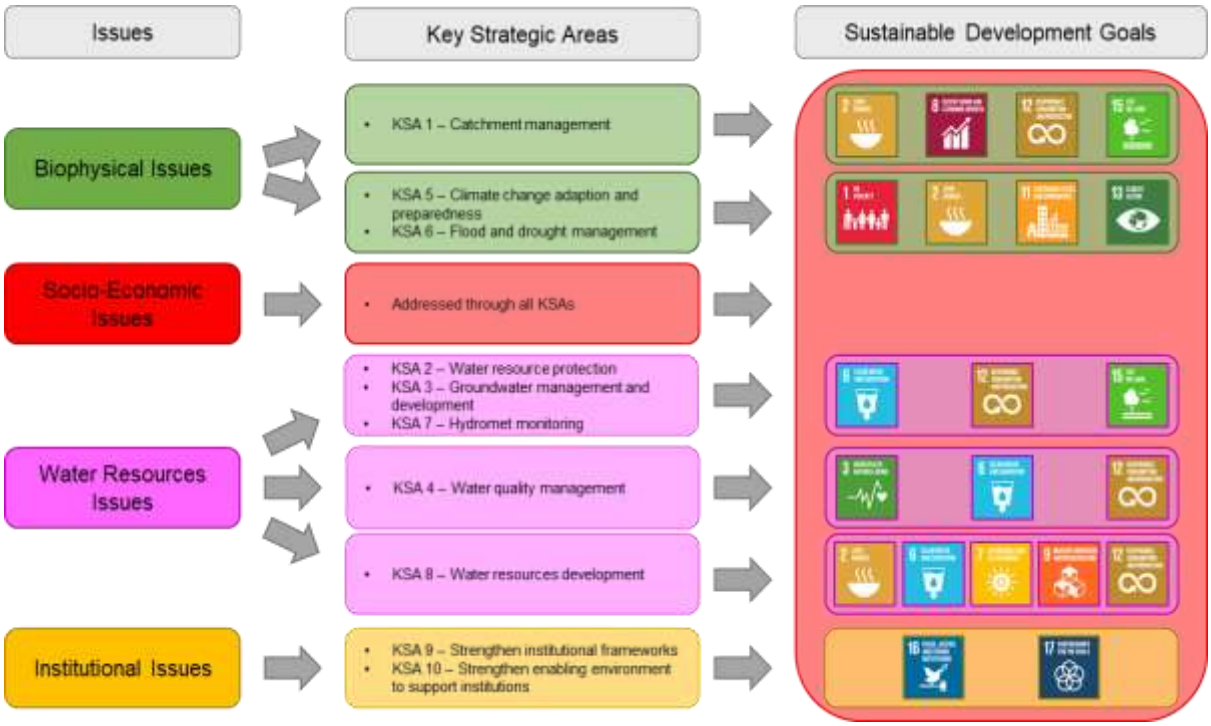

Figure 5-1: Integration of the SDGs into the six Basin Plans

5.2.3 Linkages with other existing plans

The Basin Plans provide a vision and framework for the development and management of the water and related land resources of Kenya's six river basins. Essentially the plans reinforce the CMSs (2015-2022), supplement the NWMP 2030 and act as a source of information for the development of Sub-Catchment Management Plans (SCMPs), which Water User Associations (WRUAs) will implement. Whereas the basin plans contextualise the SCMPs, the SCMPs remain the resource mobilisation tools that WRUAs will use to source implementation funds and other resources. County governments are also involved in implementation activities, and as such will be required to review the basin plans and SCMPs to ensure that the County Integrated Development Plans (CIDPs) are linked and synchronised with the overall basin planning initiatives. Relevant Regional Development Authorities as well as Water Works Development Agencies also need to review their proposed and existing projects to align with the investment plan as presented in the Basin Plans.

Since devolution of the government the county government holds more responsibility for the management of biodiversity and protected areas. Whilst the Basin Plans are mobilised through the SCMPs the county governments need to integrate existing environmental programmes with the outcomes of the basin planning process. This would require review of not only the development options, but the relevant KSAs as discussed in Section 4. These KSAs were formulated to address issues in each basin as defined in Section 3. There should also be improved institutional coordination to ensure that the development plans for MEAs, NEMA, KWTA, KFS, KWS and CBOs/NGOs are aligned with the outcomes of the Basin Plans.

5.3 Key Strategic Areas, Themes and Budgets

Under the Themes and Strategies which were formulated for the ten Key Strategic Areas (KSAs), prioritised implementation / action plans were prepared for each of the six river basins in Kenya. Awareness of the interconnectivity of the ten KSAs within the context of IWRM is important to guide the systematic and integrated implementation of actions emanating from the various KSAs. The interrelatedness of the KSAs are depicted schematically in **Error! Reference source not found.**. The interconnectivity ranges from direct impacts or benefits, such as the construction of a dam (KSA 8) which can improve flood control (KSA 6), to multi-dimensional impacts or benefits, such as creating a stone check dam to reduce soil erosion (KSA 1), which also reduces runoff (KSA 6) and improves water quality (KSA 4). These relationships, both direct and indirect, are important to note during implementation. Addressing one issue in a specific area through implementation of an activity may create further issues that were not predicted or could provide additional benefits.

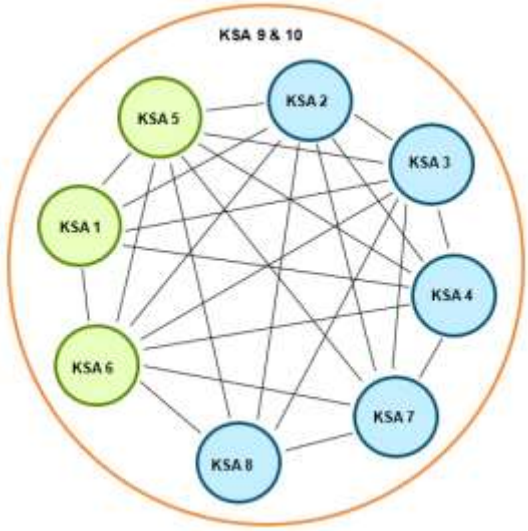

Figure 5-2: Interconnectivity of the KSAs

Table 5-1 presents key themes under each KSA which are relevant to biodiversity, protected areas and tourism, along with estimated implementation budgets, per basin, up to the planning horizon of 2040.

The national estimated budget which is required for implementation of integrated water resources management and development activities up to 2040 in all basins and across all KSAs equals about **29 billion USD**. The biodiversity, protected areas and tourism sectors are linked to about **885 million USD** of the National Budget as shown in Table 5-1. The KSAs that demand the largest expenditure from a biodiversity, protected areas and tourism sector perspective are KSA1: Catchment Management and KSA5: Climate Change Adaptation and Preparedness.

It is important to ensure that the implementation of the KSA actions emanating from the Basin Plans are aligned with relevant legislative, policy and institutional principles and guided by internationally accepted standards for good practice to attain the goals of social acceptability, economic viability and technical sustainability.

Table 5-1: Summarised IWRM budget for implementation activities linked to biodiversity, protected areas and tourism under specific Key Strategic Areas

Key Strategic Areas and Themes		Budget (USD million)						
		Athi	Tana	LVS	LVN	ENN	RV	Total
KSA 1	**Catchment management**	85	110	80	87	46	83	**490**
	Promote improved and sustainable catchment management							
	Natural resources management for protection & sustainable use							
	Rehabilitation of degraded environments							
KSA 2	**Water resources protection**	5	5	5	5	5	5	**28**
	Classification of water resources							
	Reserve determination							
	Determine Resource Quality Objectives							
	Conserve and protect ecological infrastructure							
KSA 4	**Water quality management**	7	2	1	1	2	2	**15**
	Promote sound water quality management governance							
KSA 5	**Climate change adaptation and preparedness**	39	39	32	35	26	33	**203**
	Understand impacts of climate change on water resources at appropriate spatial scales							
	Climate change mitigation							
	Climate change adaptation							
KSA 8	**Water resources development**	0.2	0.2	0.2	0.2	0.2	0.2	**1**
	Water based tourism and recreation							
KSA 10	**Strengthen enabling environment to support institutions**	25	25	25	25	25	25	**148**
	Develop institutional capacities to support improved IWRM&D							
Total		**160**	**180**	**142**	**153**	**104**	**147**	**885**

5.4 Roadmap for Sector Integration

In order to ensure the successful implementation of the strategies and actions from the six Basin Plans and National Plan as they relate to biodiversity, protected areas and tourism, a Roadmap for Implementation is proposed. This Roadmap proposes that before any actions identified under the KSA implementation plans are implemented, there are preceding critical activities. These are as follows (Figure 5-3):

1. Immediate KSA activities
    a. Strengthening of institutional capacity and coordination;
    b. Imminent infrastructure feasibility and impact assessments;
    c. Expand on the basin plan knowledge base
2. Financial Resource Mobilisation for the KSA activities
3. Implementation of the short to long-term KSA activities
4. Monitoring and Evaluation of the KSA activities

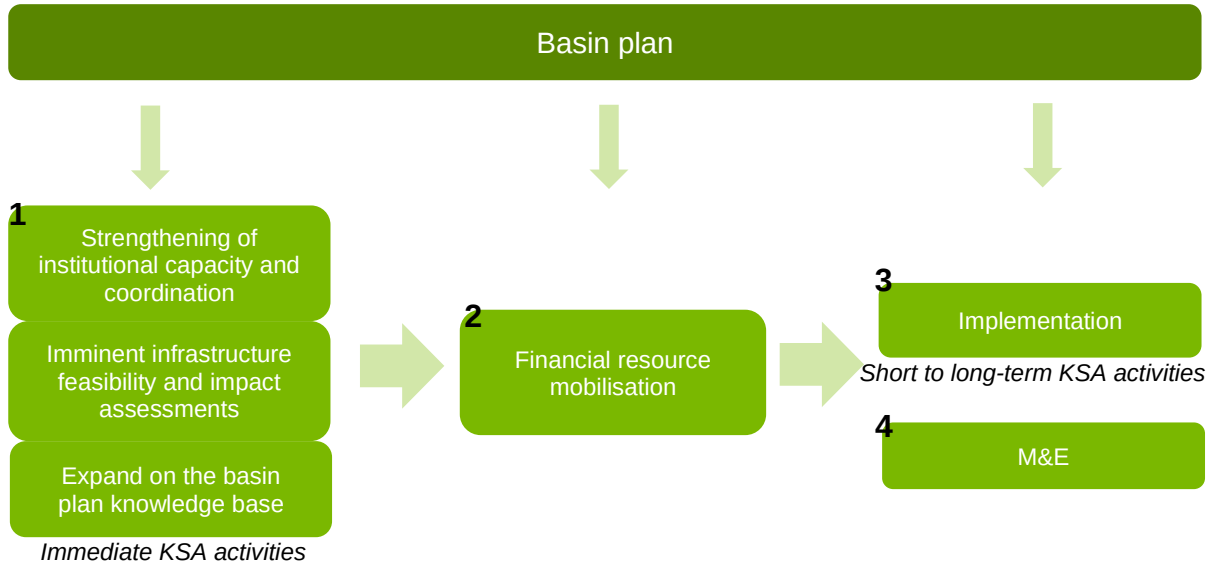

Figure 5-3: Roadmap for implementation of the Basin Plans

5.4.1 Immediate actions

5.4.1.1 Strengthening of institutional capacity and coordination

Strong institutions are necessary for effective governance. Not only must they be strong, but they must be well linked with partner institutions. On a national scale, there are many role players working in similar areas, and poor coordination can result in the duplication of efforts and failure of implementation. It is therefore not surprising that effective implementation must be rooted in strong institutions and partnerships.

Having strong institutions also provides invaluable benefits for securing external financing. When completing a risk assessment, strong institutions with good coordination mechanisms will have a much

lower risk profile than their counterparts, making them an attractive investment opportunity for both development partners and the private sector.

IWRM requires the integration of various activities for the equitable and efficient management and sustainable use of water. There are many role players involved, at different scales (i.e. national to local scale), and before any activity is initiated it is critical to ensure that there are platforms in place for engagement.

The KSAs can also be used as a planning tool for key role players, without these institutions needing to sit in the same room. For example, should KFS want to implement a reforestation program, they can refer to the Basin Plans for information on which institutions and organisations they should collaborate with, and over what timelines implementation should take place.

The main role players in the biodiversity, protected areas and tourism sector are MoEF, MoTW, MoWSI, NEMA, KWTA, KWS, KFS and the county government (Table 5-2).

Table 5-2: Biodiversity, protected areas and tourism implementation plan role players

		KSA1	KSA2	KSA4	KSA5	KSA8	KSA10
Ministries	MoEF	☑	☐	☑	☑	☐	☐
	MoTW	☑	☐	☐	☐	☑	☐
	MoWSI	☑	☐	☐	☐	☐	☑
	MoALF	☐	☐	☑	☐	☐	☐
	MoEn	☐	☐	☐	☑	☐	☐
National	NEMA	☑	☑	☑	☑	☐	☐
	KWTA	☑	☐	☐	☐	☐	☐
	KFS	☑	☐	☐	☑	☐	☐
	KWS	☑	☐	☐	☐	☐	☐
	AFFA	☑	☐	☐	☐	☐	☐
	WRA	☑	☑	☑	☑	☐	☐
	KMD	☐	☐	☐	☑	☐	☐
	NDMA	☐	☐	☐	☑	☐	☐
	NDOC	☐	☐	☐	☑	☐	☐
	CETRAD	☐	☐	☐	☑	☐	☐
	KPLCO	☐	☐	☐	☑	☐	☐
	MoEn	☐	☐	☐	☑	☐	☐
	KENGEN	☐	☐	☐	☑	☐	☐
	MoLPP	☐	☐	☐	☑	☐	☐
	MoTIHUDPW	☐	☐	☐	☑	☐	☐
	NWHSA	☐	☐	☐	☑	☐	☐
	KENHA	☐	☐	☐	☑	☐	☐
	KURA	☐	☐	☐	☑	☐	☐
	NIB	☐	☐	☐	☐	☐	☐

		KSA1	KSA2	KSA4	KSA5	KSA8	KSA10
Basin	BWRC	☑	☐	☑	☐	☐	☑
	CETRAD	☐	☐	☐	☑	☐	☐
	WWDA	☐	☐	☐	☐	☐	☐
Local	WRUA	☑	☐	☑	☑	☐	☑
	CG	☑	☐	☑	☑	☑	☑
Other	CFA	☑	☐	☐	☐	☐	☐
	WWDA	☑	☐	☐	☐	☐	☐
	WSP	☑	☐	☐	☐	☐	☐
	NGO	☐	☐	☐	☑	☐	☐

5.4.1.2 Immediate implementation activities

The timelines of the KSAs have been developed in such a way as to stagger the activity implementation across four planning horizons: immediate (2020 – 2022), short-term (2022 – 2025), medium-term (2025 – 2030) and long-term (2030 – 2040).

The 'immediate' time-frame has specifically been developed to provide direction on which activities will be most beneficial to institutional strengthening. These 'immediate' activities will also require funding, and the key role players and other relevant partners should develop strategies for generating financing. However, it is likely that the financing may have to come from the institutions themselves. This can be considered as a long-term investment – by investing now in strengthening institutional capacity, finances will be more easily mobilised for future activities. These immediate activities are also relatively cheap in comparison to larger catchment size activities, or infrastructure activities.

Table 5-3 presents the 'immediate' activities under the most important KSAs which are relevant to the biodiversity, protected areas and tourism sectors.

Table 5-3: Immediate implementation activities

KSA	Priority activities (immediate)
KSA 1 Catchment Management	
– Coordinate approach to forestry management – roles, responsibilities and mandates	
KSA 2 Water resource protection	
– Classify all significant water resources (conducted prior to Reserve and RQO determination) – Determine the Reserve for prioritised water resources (note Reserve required for RQOs) – Determine the Resource Quality Objectives for prioritised water resources	
KSA 4 Water quality management	
– Identify streams for piloting biomonitoring and undertake pilot studies – Advocate for alignment of strategies to serve a common purpose of rehabilitating urban rivers and streams	
KSA 5 Climate change adaptation and preparedness	
– Quantify climate change impacts (rainfall & temperature) on surface water and groundwater resources and demands at appropriate scales for planning and management – Assess potential social impacts: flooding; droughts; human conflict; migration; vulnerable groups; ocean acidification; agriculture; food production – Assess potential environmental impacts: droughts; sea temperature; rising sea levels; ocean acidification; desertification; lad degradation; loss of biodiversity; deforestation; forest degradation – Assess potential economic impacts: irrigation water requirements; crop type and yield; GDP; public Infrastructure; hydropower; coastal assets; livelihoods and income generation. – Incorporate flexible adaptation infrastructure principles in infrastructure planning and investment plans	
KSA 10 Strengthen the enabling environment to support institutions	

KSA	Priority activities (immediate)
	– Development of technical and management capacity through focused training, continuous professional development, bursary schemes, audits, incentive schemes – Develop a partnerships framework – Identify potential partners – Strengthen existing partnerships, particularly on a local level – Undertake stakeholder consultations – Undertake awareness creation and information dissemination activities – Develop and strengthen guidelines for MOU Final Drafting and development – Develop a basin-wide stakeholder engagement framework – Undertake stakeholder analysis – Implement the stakeholder engagement framework – Strengthen stakeholder engagement platforms i.e. forums – Strengthen links with tertiary education / research institutions – Incorporate R&D into WRM planning and decision making – Establish a network of supporting research institutions – Develop strategic partnerships for R&D – Promote innovative financing for basin level institutions (BWRCs, WRUAs, forums) – Develop internal resource mobilization strategies – Develop external resource mobilization strategies – Exploring private sector financing channels – Strategic partnerships for resource mobilization

5.4.2 Financial resource mobilisation

Resource mobilisation refers to the various activities involved in making better use of existing resources to maximum benefit, whilst ensuring the ongoing acquisition of additional resources to ensure the achievement of organisational intent. These resources include financial resources, but also include human resources and their organisational management, equipment, services, and technical cooperation. The range of these resources and their impact is outlined in the resource mobilisation position paper.

Section 5.4.1. outlined the importance of developing strong institutions. Part of this strengthening refers to developing the human and organisational resources. While this is a vital component, financial resources are needed to strengthen these other resources, as well as implement projects.

A review of successive WRA performance reports reflects the challenges that WRA has faced financially, and shows successive funding gaps (WRA, 2017). These have considerable institutional implications for the WRA that require consideration in developing an approach to not only strengthen the WRA, but to also underpin this with a sustained funding regime. Without this strategic intent to coherently develop the business model together with resource mobilization, the overall sustainability of the institution is at risk.

There are numerous forms of external financing, each with their own type of stakeholders and investment mechanisms.

- Innovative financing avenues can include philanthropic and public, water funds and facilitates, payment for ecosystem services, effluent charges, climate change funding schemes, carbon finance, corporate grants, impact investments and conservation finance.
- The key stakeholders and partners for these avenues can include development agencies, governments, multilateral development banks, public private partnerships, private or state banks, private sector, NGOs, asset managers and international councils and secretariats.
- The investment mechanisms can include grants, subsidies, guarantees, soft/hard loans, guaranteed philanthropy, result based payments, equity, loans, environmental impact bonds and microfinance.

It is important to note that different KSA activities will require different levels of partnership and will therefore have to tap into different financing avenue. Using the resource mobilization strategy as a

base, it will be necessary for the WRA or the key implementing agency (as outlined in the KSA) to develop a resource mobilization and financier engagement strategy that is applicable to each specific activity.

The biodiversity, protected areas and tourism sectors will need to engage with WRA to ensure that financial mobilisation is shared according to aligned objectives.

5.4.3 Implementation and M&E

Having initiated the coordinated strengthening of institutional capacity as well as resource mobilisation as immediate critical actions, other activities in each KSA should be considered for implementation. These activities are typically costlier and have a longer implementation horizon. They also often deal with more physical interventions, and therefore require a stronger local presence and engagement. Implementation Plans for each KSA were developed, which provide a clear intent and prioritised plan of action. The implementation plans present theme priorities (i.e. critical, very important, important), activities (i.e. implementation actions), indicators to measure outcomes of activities, implementation horizon (i.e. immediate (1-2yr), short (2-5yr), medium (6-10yr) or long (11-20yr) term), responsibility for activity (i.e. at the basin scale, national scale, local scale and key stakeholders) and estimated budgets for implementation of individual activities along with possible funding sources per activity identified.

Table 5-4 summarises IWRM budgets for implementation activities linked to biodiversity, protected areas and tourism under specific Key Strategic Areas for a planning horizon up to 2040. Detailed implementation plans are provided in the respective basin plans.

5.4.4 Stakeholder engagement

During the National workshop on the 13th and 14th October 2020 stakeholders were given the opportunity to discuss the roadmap for sector integration. They provided inputs for step 1-4 for the biodiversity, protected areas and tourism sectors. The main outcomes are presented in **Annexure A**.

The main outcomes from the session indicated that partnership needs trust and coordination; it is important to use data to inform decision making and drive transparency/receive funds; external monitoring allows for expertise that may be lacking in the institution.

Table 5-4: Summarised IWRM budget for implementation activities linked to biodiversity, protected areas and tourism under specific Key Strategic Areas up to 2040

Key Strategic Areas and Themes		Budget (USD Million)				
		2020-2022	2022-2025	2025-2030	2030-2040	Total
KSA 1	**Catchment management**	23.5	182.5	159.3	125.2	**490**
	Promote improved and sustainable catchment management					
	Natural resources management for protection & sustainable use					
	Rehabilitation of degraded environments					
KSA 2	**Water resources protection**	1.8	4.5	10.5	11.4	**28**
	Classification of water resources					
	Reserve determination					
	Determine Resource Quality Objectives					
	Conserve and protect ecological infrastructure					
KSA 4	**Water quality management**	5.7	3.3	2.3	3.6	**15**
	Efficient and effective management of point and nonpoint sources of water pollution					
KSA 5	**Climate change adaptation and preparedness**	21.0	66.7	69.0	46.5	**203**
	Understand impacts of climate change on water resources at appropriate spatial scales					
	Climate change mitigation					
	Climate change adaptation					
KSA 8	**Water resources development**	-	0.3	0.3	0.4	**1**
	Water based tourism and recreation					
KSA 10	**Strengthen enabling environment to support institutions**	31.5	54.1	26.3	35.8	**148**
	Develop institutional capacities to support improved IWRM&D					
Total		**84**	**311**	**268**	**223**	**885**

6 Conclusion

Integrated Water Resources Management is based on the equitable and efficient management and sustainable use of water. It recognises that water is an integral part of the ecosystem, a natural resource, and a social and economic good, whose quantity and quality determine the nature of its utilisation (Global Water Partnership, 2006). This emphasises the importance of an integrated approach towards water resources planning, development and management - focusing on an enabling environment, institutional framework and setting up the management instruments required by institutions to understand mandates, roles and responsibilities to effectively and seamlessly do their job.

The basin planning process provides a status quo of the current water resources management situation and a plan for future management. There is no correct administrative model to ensure successful implementation. However, the principles of IWRM allow for selecting, adjusting and applying a mix of tools for a given situation and agreeing on milestones and timeframes is critical for success.

The Sectoral Integration Plans can be used to implement activities outlined in the Key Strategic Areas of the Basin Plans, particularly where the responsibilities are for sector-specific role players or institutions. Some activities should be implemented sector-wide rather than basin-wide as implementing via a sectoral-wide approach will enable implementation across the country and will not be limited to the hydrological boundaries. It is recommended for WRA to plan for the activities of which responsibility will be given to another institution, as well as how WRA will manage that partnership, such as receiving monthly reports or conducting regular meetings. At the same time, WRA will need to decide whether full responsibility is given to another institution or how and where WRA should maintain involvement. The detailed implementation tables in the Basin Plans provide key role players for each activity, which should guide these decisions.

This Sectoral Integration Plan for the biodiversity, protected areas and tourism sectors is a key deliverable towards the overall objective of the KWSCRP namely to strengthen the Water Resources Authority as it relates to water resource management and planning through the development of tools, skills and infrastructure to deliver on its mandate. The outcome will be a stronger WRA institution that has strengthened capacity to carry out its core functions with regard to integrated basin management and planning in a manner that is based on extensive knowledge-driven analysis and that meets the expectations of key stakeholders.

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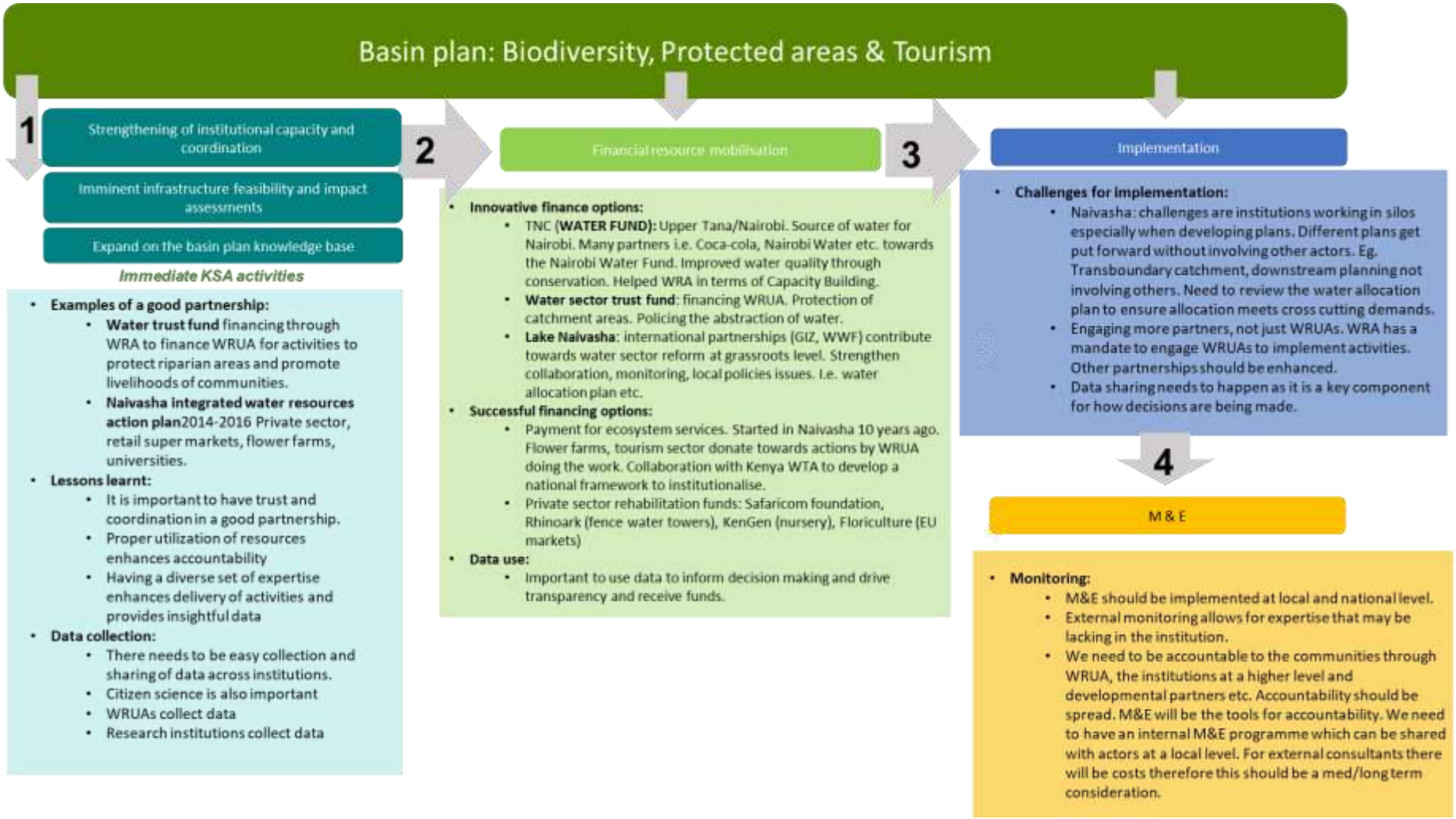
Annexure A: Stakeholder engagement



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