

# HOW MUCH SHOULD WE ALLOCATE A WATER PROJECT IN BARINGO COUNTY?





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## COST REFERENCE DOCUMENT

BARINGO COUNTY GOVERNMENT-DEPARTMENT OF WATER AND IRRIGATION IN PARTNERSHIP  
WITH CENTRE FOR ENHANCING DEMOCRACY AND GOOD GOVERNANCE

### **CENTRE FOR ENHANCING DEMOCRACY AND GOOD GOVERNANCE**

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# FOREWORD



Hon. Dr. Maureen Rotich, PhD.

The mandate of the Department of Water and Irrigation is to enhance access to clean and safe water, high quality sewerage services and conserving environment while promoting sustainable utilization of natural resources.

The development of this Cost Reference is based on a participatory review of performance of the Water and Irrigation Department on Budget Implementation and by extension delivery of our mandate. Over the last few years, the department has faced challenges in budget absorption. One of the causes of this has been inadequate budget allocation. There are also projects which have failed to take off due to technical viability challenges.

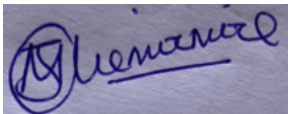
The problem is more pronounced in the ward level projects where citizens and respective members of the County Assembly have more say on how much they allocate to each project. Absence of appropriate technical assistance has seen communities allocate monies arbitrarily. The water sector has suffered more because of the unique nature of each water project. The problem is further compounded by the existence of diverse ecological zones in Baringo County which varies costs for water projects and should therefore be taken into account during budget allocation but is often not.

To redress this, the department partnered with the Centre for Enhancing Democracy and Good Governance (CEDGG) to develop a cost-reference for the water sector projects. This document provides proposals on the cost of key components of various water projects in different geographical locations in Baringo County informed by previous feasibility studies and historical costs of doing similar projects. The purpose of the Reference is to provide guidance for allocations to water projects especially during public budget hearings so as to ensure all components for specific water projects are adequately catered for. If well utilized, it is expected that the reference will increase water projects' completion rates and therefore enable the department to deliver on its mandate better.

The Department of Water and Irrigation will oversee implementation of the Cost Reference. Even then, it is our collective duty as stakeholders, both state and non-state, to disseminate

and apply the document as reference for identification and funding of viable water projects. As in the nature of policies, this document is not cast in stone. Therefore, we will regularly monitor and evaluate its implementation to ensure that any gaps are addressed. Particularly, due to the inevitable inflation or deflation of prices, this document will be updated every 3 years.

Lastly, I take this opportunity to sincerely thank the entire team involved in the formulation and development of this cost reference, including all the relevant stakeholders for their contribution in the process. With this kind of commitment and partnerships, I am confident that we will deliver on our vision of Water for all in a clean, safe and sustainable environment.



**Hon. Dr. Maureen Rotich, PhD.**

County Executive Committee Member,  
Department of Water and Irrigation,  
Baringo County Government.

## ACKNOWLEDGEMENTS

The development of this Water Projects Cost Reference was made possible by the commitment and leadership of a number of individuals and offices. It is not possible to singularly thank all of them. However, we wish to make special mention of the technical officers in County Government of Baringo who spearheaded the entire process and provided information contained in this document. The support and cooperation of the CEC Department of Water and Irrigation, Mr. Noah Chepwarwa, the Director for Water and Irrigation, Mr. Wesley Kiprof the Director for Civic Education and Mr. Jacob Kendagor, Head of Budget, was very valuable. Ms. Irene Cheron, Mr. Henry Omwando & Mr. Ronald Osanse and all the other Sub-county Water Officers; Mr. Michael Ng'etich, Mr. Solomon Kimuna & Mr. Richard Tumeiyo from the Department of Finance and Economic Planning, sub-County and Ward Administrators; Mr. Jackson Kimtai, Mr. Jonathan Kiptum & Mr. Lopez Charim who are clerks to the County Assembly Committees of Budget and Appropriations, Finance and Economic Planning and Water & Irrigation respectively, all played important roles throughout the process.

A number of Members of the Baringo County Assembly actively engaged and contributed to the process. Among these include: Hon. Kipruto Kimosop, Chairman Committee on Delegated Legislation/MCA Mochongoi Ward, Hon. John Aengwo, Chairman Budget and Appropriations Committee/ MCA Saimo Kipsaraman Ward, Hon. Joseph Oleparsalaach Deputy Majority Leader/MCA Ilchamus Ward, Hon. Paul Kibarar vice chair, Budget and Appropriations Committee/MCA Emining Ward; and Hon. Renson Parkei – Chairman Water and Irrigation Committee/ MCA Mukutani Ward.

Our sincere gratitude also goes out to all the Budget Champions, members of the Baringo County Civil Society Organization Forum (BACSOF), Members of Water Projects Implementation Committees as well as the water projects Contractors interviewed, for supplying vital information on their experiences with regards to budget formulation and implementation.

A special space is reserved for Eng. Amos Kiptanui for his technical lead role in the process and compilation of this document.

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*Chief Officer, Department of Water and Irrigation., Baringo County Government*



# 1. INTRODUCTION

Baringo County Government is implementing its second Integrated Development Plan since the beginning of devolution and establishment of County Governments in 2013. Every year citizens are engaged in prioritizing development projects and allocation of resources for their implementation. A reflection on the experience of budget consultations in the water sector over the years has revealed several issues including but not limited to:

1. Water remains top priority in Baringo County;
2. Many citizens lack knowledge on the steps involved in water development especially the preliminaries;
3. There has been arbitrary allocation to water projects without justifiable criteria since the cost of specific water projects varies from one ecological zone to another.
4. Water projects suffer in-adequate allocation leading to roll overs. The net effect is disappointment by citizens who are the beneficiaries.

This **Cost Reference Document** is therefore meant to serve as a guideline on suitable water projects (boreholes, water pans, earth/masonry/concrete dams, sand dams, sub surface dams, river abstraction, well development, springs protection and abstraction among others) and corresponding costs for different ecological zones and sub counties. This will enable citizens to identify, select and allocate adequate resources to successfully complete the development of water projects.

## 1.1. Background information

### 1.1.1 Location of Baringo County

Baringo County is situated in the Rift Valley region. It borders Turkana and Samburu counties to the north, Laikipia to the east, Nakuru and Kericho to the south, Uasin Gishu to the southwest, and Elgeyo-Marakwet and West Pokot to the west. It is located between longitudes 35 30' and 36 30' East and between latitudes 0 10' South and 1 40'. The Equator cuts across the county at the southern part. Baringo covers an area of 11,015.3km<sup>2</sup> of which 165km<sup>2</sup> is covered by surface water including Lake Baringo, Lake Bogoria and Lake Kamnarok.

### 1.1.2 Administrative Units

Baringo county government administrative units comprise of six sub counties and 30 wards, with the largest sub county being Tiaty with an area of 4540 square kilometers and the smallest being Baringo Central with 588.52 square kilometres. The wards are also vast in sizes with the largest ward being Tirioko ward with 1102.68 square kilometers and the smallest being Ravine

ward being 33.55 square kilometers. The County Government Act established the Village Administrative Units as the lowest administrative units in the Counties but are yet to be created in Baringo County.

**Table 1: Area by Sub-county and Ward**

Sub County	Area in Km <sup>2</sup>	Electoral Wards	Area in Km <sup>2</sup>
<b>Baringo North</b>	1703.50	Barwesa	475.5
		Saimo Kipsaraman	85.60
		Saimo Soi	542
		Kabartonjo	126.70
		Bartabwa	473.50
<b>Tiaty</b>	4540.48	Tirioko	1102.68
		Kolowa	752.55
		Ribkwo	871.49
		Silale	335.36
		Tangulbei	591.25
		Loiyamorock	597.80
		Churo-Amaya	289.35
<b>Mogotio</b>	1303.87	Mogotio	287.53
		Emining	529.21
		Kisanana	487.13
<b>Baringo south</b>	1985.11	Mukutani	534.90
		Marigat	682.71
		Ilchamus	180.70
		Mochongoi	586.80
<b>Eldama ravine</b>	953.82	Lembus	142.89
		Ravine	33.55
		Lembus-Kwen	178.01
		Koibatek	254.37
		Lembus-Perkera	130.20
		Mumberes/Majimazuri	214.80
<b>Baringo Central</b>	588.52	Kabarnet	165.68
		Sacho	105.98
		Tenges	123.94
		Kapropita	96.35
		Ewalel-Chapchap	96.57

Source: CIDP Baringo, 2018-2022

### **1.1.3 Climatic conditions**

The rainfall varies from 1,000mm to 1,500mm in the highlands to 600mm per annum in the lowlands. Due to their varied altitudes, the sub-counties receive different levels of rainfall. Eldama sub-county receives the highest amount of rainfall. The lowland sub-counties of Mogotio, Baringo South, East Pokot and Baringo North receive relatively low amounts. The temperatures range from a minimum of 10°C to a maximum of 35°C in different parts of the county. Average wind speed is 2m/s and the humidity is low. The climate of Baringo varies from humid high-lands to arid lowlands while some regions are between these extremes.

### **1.1.4 Water resources**

Being an ASAL county, Baringo has prioritized the provision of water for human, livestock and irrigation as a necessary requirement for the general development of the county. Water shortage is prevalent, especially around Lake Baringo and Lake Bogoria, parts of Kerio Valley, Mogotio, western slopes of Ng'elecha (Mochongoi) and the entire Tiaty (Kolowa to Tangulbei). This is caused by the low rainfall received and cyclic droughts. This has hindered development in livestock production and farming activities, as people spend many hours daily looking for water.

Water from Lake Baringo has not been exploited for domestic use and irrigation. The county government support efforts to upscale construction of water pans and dams as well as ground water in order to solve water shortage, especially during dry seasons. The county government collaborates with partners in development of water resources. Currently (2020) Central Rift Valley Water Works Development Agency (CRWWDA) is in the process of drilling several boreholes in Baringo County to increase water accessibility. The ongoing Chemususu phase two, covering Mogotio, Eldama ravine and parts of Nakuru, is one of the long-term strategies in solving water shortage in the county. Other water development initiatives to be supported by the county government include abstraction of water from rivers, spring protection, harvesting of rain water from roof and other catchments.

Major rivers like Kerio, Waseges, Emsos, Lobo, Perkerra and Molo together with their tributaries could be tapped for domestic use and irrigation. Other rivers that may be of importance, though seasonal, are Amaya, Nginyang', Mukutani, Arabal and Endao.

### **1.1.5 Water supply schemes**

Water supplies are managed by county through two companies (Kirandich and Chemususu) and the community. The county has scarce water sources and most of the population relies on water from streams. Phase two of Kirandich Dam in Kabarnet will expand coverage and

thus serve higher population. The water distribution system needs to be expanded in all parts of the county.

The county government through the Ministry of Water and Irrigation (MoWI) promote, support and encourage implementation of projects geared towards expanding water supply coverage to communities through own or partnership initiatives. The county government purpose to mobilize resources internally and externally to finance such initiatives. *The main supply schemes include the ongoing Chemususu water project distribution (by National Government) and rehabilitation and expansion of Ol Arabal Water Project being implemented by Kirandich Water Company Limited (KIWACO) and Water Sector Trust Fund, a State Corporation under the ministry of Water, Sanitation and Irrigation implementing the EDE CIPRA programme funded by GoK and European Union with contribution from Baringo County Government.*

#### **1.1.6 Water sources and access**

The sources of water in the county include dams, lake, water pans, streams, wells, springs and boreholes. They are piped water or point sources. Water from vendors, especially in urban centres and small market centres, constitute a small percentage. The average distance to the nearest water point is 5km. This is way below the SHERE Standards on access to water. The county government has and will continue to institute measures, policies and programmes that will improve water access and also engage with partners to reduce distance to water points to the acceptable standard of 30 minutes' walk. The Bill on Human Rights lists water as one of the human rights. Policy makers should put in measures to increase accessibility.

#### **1.1.7 Water management**

Baringo County has two water companies which manage water (Chemususu and Kirandich). Chemususu Water Company manages Eldama Ravine and Mogotio Sub-counties while Kirandich Water Company manages Baringo Central, Baringo North, Baringo South and Tiaty sub-counties.

### **1.2 Objective for the Cost Reference**

The main objective of the Cost Reference Document is to assist the citizens/ communities during public participation, citizen engagement and involvement in Annual Work Plan and Budgeting (AWP&B) process in Baringo County targeting the water sector. It shall be used to sensitize the communities/citizens so that they can understand the process/procedure involved and scope for development of specific water projects (boreholes, water pans, earth/

masonry/concrete dams, sand dams, sub surface dams, river abstraction, well development, springs protection and abstraction among others). This will enable communities/citizens to allocate adequate resources (land, financial, time etc) for water projects to be completed. *The cost of water projects varies from one ecological zone to another and therefore this Cost reference document has desegregated the cost of water development in every sub county in Baringo County.*

### 1.3 Rationale/Challenge

Baringo County Government has developed two five (5) development blue print for the County since the beginning of devolution and establishment of County Governments in 2013. This is called County Integrated Development Plan (CIDP) 2013-2017 and 2018-2022. Annual Development Plans (ADPs) are extracted from CIDP. Every year citizens are engaged in prioritizing their local ADPs as required by law. ADP process involves Planning & Budgeting often referred to as Annual Work Plan and Budgeting (AW&B). *Public participation is mandatory and during this annual exercise citizens are required to present their prioritized development projects. This document focuses on water projects in Baringo County. Once this pilot is successful, it will be rolled out in other sectors in Baringo County.*

Citizen/public participation is good, however there are challenges including:

5. High Demand for water projects;
6. low knowledge on the steps involved in water development especially the preliminaries among residents;
7. In the absence of objective criteria, allocation to water has been arbitrary. Arbitrary allocation without justifiable criteria since the cost of specific water projects varies from one ecological zone to another. In addition, some projects are suitable in some areas while others are not for instance boreholes are suitable in some areas while water pans or river abstraction are suitable in other areas. Moreover, citizens do not appreciate the steps involved and suitability of such projects in their locality.
8. In-adequate allocation leading to roll overs. MCAs need as many projects as possible instead of meaningful development and completion. There are many projects planned however few are visible on the ground.

The net effect is disappointment by citizens who are the beneficiaries.

This **Cost Reference Document** is therefore a guideline on suitable water projects (boreholes, water pans, earth/masonry/concrete dams, sand dams, sub surface dams, river abstraction,

well development, springs protection and abstraction among others) and corresponding costs for different ecological zones and sub counties. *This will enable the citizens to identify, select and allocate adequate resources to successfully complete the development of water projects in Baringo County.*

#### **1.4 Application/Coverage/Scope**

This cost reference document applies to the water sector and covers six sub counties in Baringo County. It includes the following components of water projects development:

1. Preliminaries
  - i. Hydrological Assessment Reports for surface water development
  - ii. Hydrogeological Assessment Reports for Ground Water development
  - iii. Data collection for all water projects; Survey and design for all water projects; and Development of bill of quantities, technical specifications and working drawings
  - iv. Environment and Social Impact Assessment Reports, approval and licensing by National Environment Management Authority (NEMA).
  - v. Application of Authorization and permits from Water Resources Authority (WRA) for water development
  - vi. Tendering process by procuring entity
2. Estimated Costs for development of various water projects in every Sub County in Baringo County including the following:
  - i. Boreholes
  - ii. River/Stream Abstraction
  - iii. Water Pans
  - iv. Storage Tanks
  - v. Pipeline Extension
  - vi. Water Kiosks (WK)/Livestock Water Troughs (LWT)/Community Water Point (CWP)/Tap Stand (TS)

## 2. LEGAL FRAMEWORK

### 2.1 Water Act No. 43 of 2016 (Chapter 372 of Laws of Kenya)

This is an ACT of Parliament to provide for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes. It was assented on 13<sup>th</sup> September, 2016. PART II section (5) of the act states that "Every water resource is vested in and held by the national government in trust for the people of Kenya".

Section 9 gives every person has the right to access water resources, whose administration is the function of the national government as stipulated in the Fourth Schedule to the Constitution. Part III, section (11) establishes Water Resource Authority (WRA) for regulation of the management and use of water resources including receive water permit applications for water abstraction, water use and recharge and determine, issue, vary water permits; and enforce the conditions of those permits.

Section 40 gives the procedure for application of water permit. Section 40 sub section 4 states that "An application for a permit shall be the subject of public consultation and, where applicable, of environmental impact assessment in accordance with the requirements of the Environmental Management and Co- ordination (Amendment) Act, 2015".

Section 143 sub section 1 (a) prohibits un authorized willful obstruction, interference, diversion of water from any watercourse or any water resource, or negligently allowing any such obstruction, interference, diversion or abstraction; or (b) throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.

### 2.2 Water Resources Management Rules, 2007

The rules are meant to operationalize the Water Act 2016 chapter 372 of the laws of Kenya.

The Rules applies to:

1. All policies, plans, programmes, and activities that are subject to the Water Act, 2002 (Amendment 2016);
2. All water resources and water bodies in Kenya including all lakes, water courses, streams and rivers, whether perennial or seasonal, aquifers, and shall include coastal channels leading to territorial waters

Rule 16 gives the activities that require approval, authorization and permits. Sub rule 1 states

that “Any person intending to or currently undertaking any of the water use activities defined in the Act including the activities listed in the Fifth Schedule shall obtain approval from the Authority to undertake the activity”.

Sub rule 2 states that “Notwithstanding anything contained in these rules, no water works approval, authorization and permit shall be issued or renewed for the purposes of supplying water for domestic, public, commercial or industrial use within the limits of supply of a water service provider without the applicant having received consent of the licensed water service provider for the area”.

### **2.3 Environmental Management and Coordination (Amendment) Act, 2015**

Existing environmental legislation in Kenya was formulated in response to specific problems, thus they were reactive. The thrust of the legislation was almost entirely negative; stressing what should not be done. It had little relationship to environmental management, a concept emphasizing planning and incentives for environmentally sound choices.

The lack of coordination in dealing with environmental protection necessitated the need for a comprehensive Act to deal with all environmental matters. This Act referred to as Environmental Management and Coordination Act (EMCA), 1999 came into force in the year 2000, and was aimed at bringing into one legislation the 77 other statutes, which related to environmental issues yet scattered among the various government ministries. EMCA was amended in 2015

The Act gives every person in Kenya a right to a clean and healthy environment. It also confers upon every person the duty to protect and safeguard the environment. Part V of the Act provides measures for protection and conservation of the environment. Pollution of the environment through waste disposal, noise, dust, radiation, pesticides, smells is prohibited. The Authority (National Environment Management Authority) may issue and serve on any person in respect of any matter relating to the management of the environment a restoration order to require the person on whom it is served to restore the environment as near as it may be to the state in which it was before the implementation of a project or action. Thus the polluter pays principle shall apply. The Act also provides for heavy penalties on any person who commits an environmental offence under Part XIII. Section 148 provides that the Act shall prevail over any written law in force immediately before the coming into force of this Act, relating to the management of the environment.



## 2.4 Water Quality Regulations, 2006, Legal Notice No. 120

Environmental Management and Co-ordination (Water Quality) Regulations, 2006 is a subsidiary legislation for prevention of water pollution. The water quality regulation, legislative supplement number 36 was published in the Kenya Gazette on 29<sup>TH</sup> September 2006. These Regulations apply to drinking water, water used for industrial, agricultural, recreational, fisheries and wildlife purposes, and water used for any other purposes. Part II spells out ways to protect the water from pollutants such effluent from sewage treatment works, industry or other point sources into the aquatic environment without a valid effluent discharge license issued in accordance with the provisions of the Act.

Regulation 4 sub regulation 1 prohibits any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of these Regulations. Sub regulation 2 states that "No person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

<b>FIRST SCHEDULE (r. 5)</b>	
<b>QUALITY STANDARDS FOR SOURCES OF DOMESTIC WATER</b>	
<b>Parameter</b>	<b>Guide Value (maximum allowable)</b>
pH	6.5 – 8.5
Suspended solids	30 (mg/L)
Nitrate-NO <sub>3</sub>	10 (mg/L)
Ammonia -NH <sub>3</sub>	0.5 (mg/L)
Nitrite -NO <sub>2</sub>	3 (mg/L)
Total dissolved solids	1200 (mg/L)
<i>E.coli</i>	Nil/100 ml
Fluoride	1.5 (mg/L)
Phenols	Nil (mg/L)
Arsenic	0.01 (mg/L)
Cadmium	0.01 (mg/L)
Lead	0.05 (mg/L)
Selenium	0.01 (mg/L)
Copper	0.05 (mg/L)
Zinc	1.5 (mg/L)
Alkyl benzyl sulphonates	0.5 (mg/L)

## **2.5 The Environmental Management and Coordination (Strategic Assessment, Integrated Impact Assessment and Audit) Regulations, 2018**

Regulation 4 (1) states that “No proponent shall implement a project (a) likely to have a negative environmental impact; or (b) for which an environmental impact assessment is required under the Act or these Regulations; unless an Integrated Environmental Impact Assessment has been concluded and an Environmental Impact Assessment Licence granted in accordance with these Regulations.

In addition (Sub regulation 2), No licensing authority under any law in force in Kenya shall issue a licence for any project for which an environmental impact assessment is required under the Act unless the applicant produces to the licensing authority a licence of environmental impact assessment issued by the Authority under these Regulations.

### 3. DOCUMENT DEVELOPMENT PROCESS

This cost reference document was developed through consultative process involving the County Ministry of Water and Irrigation (MoWI); Water Resources Authority (WRA); contractors, suppliers, procurement, finance and planning and County Assembly.

The process also involved review of the legal requirement for water development including Water Act, 2002 (Amendment 2016) Chapter 372 of Laws of Kenya; Water Resources Management rules, 2007; Environment Management and Coordination Act, 1999 (Amendment 2015); Water Quality Regulations, 2006; Environmental Management and Coordination (Strategic Assessment, Integrated Impact Assessment and Audit) Regulations, 2003 (Amendment 2018).

During implementation of water projects, these legislation, regulations and rules form part of preliminary process that needs compliance. These include requirement for Hydrological/ Hydro-geological Assessment; Survey and Design; Environment and Social Impact Assessment and application of ESIA License from National Environment management Authority (NEMA); Application for Drilling/Abstraction Permits from Water Resources Authority (WRA) among others.

# 4. PROJECT IMPLEMENTATION PROCESSES

## 4.1 General process

The general project implementation process is given below.

1. Water Project identification based on CIDP, ADP and other criteria and priorities.
2. Land Acquisition (securing the land for project implementation including land consents, leases, way leaves among others).
3. Hydrological Assessment Reports for surface water development (River/stream abstraction).
4. Hydrogeological Assessment Reports for Ground Water development (Boreholes)
5. Data collection (for all water projects); Survey and design (for all water projects); and Development of bill of quantities, technical specifications and working drawings (for all water projects).
6. Environment and Social Impact Assessment Reports, approval and licensing by National Environment Management Authority (NEMA).
7. Application of Authorization and permits from Water Resources Authority (WRA) for water development.
8. Tendering process by procuring entity.
9. Handing over of site to contractor
10. Construction of project
11. Project handing over to community and commissioning
12. Water utilization
13. Project maintenance

## 4.2 WRA Authorization and Water use Permit

### 4.2.1 Challenges

1. Limited awareness on the water regulation/rules on use and management of water resources with regards to communities, private sector and other beneficiaries.
2. Political interference and non-compliance with water regulations and rules
3. Water usage charges/fees (Non-compliance)
4. Illegal abstraction of water (from aquifers)
5. Non-compliance due to lack of budgetary allocations for preliminaries during AWP&B
6. Ignorance from the committee on the existence of water regulations and rules for compliance (there is need for capacity building)

#### **4.2.2 Procedure for effective development of water project**

1. Hydrogeological/Hydrogeological survey
2. Environment and Social Impact Assessment (ESIA)
3. Application/Authorization to drill
4. Water abstraction permit/water usage (valid for 5 years)
5. Monitoring consumption for payment of water use

#### **4.2.3 Authorization (based on expected yield and area & aquifer maps)**

1. A (0 – 10m<sup>3</sup>/day): KShs. 1000.00
2. B (10 – 25m<sup>3</sup>/day): KShs. 5000.00
3. C (25 – 59m<sup>3</sup>/day): KShs. 20,000.00
4. D > (60m<sup>3</sup>/day): KShs. 40,000.00

#### **4.2.4 Abstraction Permit**

1. A: KShs. 0.00
2. B: KShs. 7,500.00
3. C: KShs. 25,000.00
4. D: KShs. 50,000.00

#### **4.2.5 Water Consumption Rate**

1. A: 0.00
2. B: 50 cts/m<sup>3</sup>
3. C: 50 cts/m<sup>3</sup>
4. D: 50 cts/m<sup>3</sup>

#### **4.2.6 Requirements for Authorization to Drill/ Construct**

1. Filling of WRA application (WRA 001A)
2. Copy of the title deed (Proof of land ownership)
3. Copy of ID
4. Certificate of Incorporation/ Registration for a Group/ Association, List of members, constitution etc
5. Copy of PIN
6. Extract of topographical map / GPS location
7. Hydrological Assessment/ Hydrogeological Assessment
8. Comments from WRA
9. ESIA Report/ License
10. Assessment fee/ Authorization fee

#### **4.2.7 Dams/weirs**

##### **Additional requirements**

1. Technical design report
2. Dam design report
3. Drawings showing the intake arrangement

#### **4.2.8 Irrigation Water Uses**

##### **Additional Requirements**

Soil and water conservation report that is signed by the agricultural officer. If the water is for public use area is covered by water service provider e.g KIWACO, CWACO etc

#### **4.2.9 After drilling or construction of works**

1. Borehole completion record
2. Test pumping report
3. Water quality analysis report
4. Completion certificate from the client
5. Inspection of works by WRA based on authorization conditions
6. Airline & Measuring device for abstraction (Type of meter, serial no. & operation or not)
7. Abstraction permit upon payment of permit fee

For river abstraction/dam steps 1 & 2 above are omitted

If water quality is not suitable for use, then the applicant needs to provide for treatment works before issuance of permit and provide water quality report after treatment.

**Note:** Community water projects funded by donors should involve the beneficiary from the start so that the donor meets the requirements, rules and regulations and comply.

## 5. PROJECT SUITABILITY

### 5.1 Eldama Ravine Sub County

The ranking of water sources in every Ward is given below

#### 5.1.1 Lembus Ward

1. Boreholes
2. Weirs
3. Spring protection
4. Water pans

Currently the major source is existing weirs and shallow wells

#### 5.1.2 Maji Mazuri Ward

1. Boreholes
2. Weirs
3. Water pans
4. Spring protection

Currently the major source is boreholes

#### 5.1.3 Lembus Kwen Ward

1. Weirs (under CBOs)
2. Chemususu
3. Spring protection
4. Water pans

Currently the major source is weirs and Chemususu

#### 5.1.4 Lembus Perkerra Ward

1. Weirs(Nasosura, Kasoya, Perkerra)
2. Water pans
3. Spring protection
4. Boreholes
5. Dams

Currently the major source is weirs

#### 5.1.5 Koibatek Ward

1. Weirs (Kaplesir, Kaptama, Kemtilil, Awee)
2. Water pans
3. Spring protection
4. Boreholes
5. Dams

### **5.1.6 Eldama Ravine Ward**

1. Dam (Chemsusu)
2. Weirs (Kapyet, Penonin)
3. Water pans

## **5.2 Mogotio Sub County**

### **5.2.1 Kisanana Ward**

1. Boreholes
2. Water pans

### **5.2.2 Emining Ward**

1. Boreholes
2. Direct river abstraction (Molo, Emining & Perkerra)

### **5.2.3 Mogotio Ward**

1. Direct river abstraction (Molo, Narosura, Esageri, Perkerra & several tributaries)
2. Boreholes
3. Kelelwa water supply (Molo river upstream, weir)
4. Water pan
5. Spring protection (Sirwa)

## **5.3 Baringo North Sub County**

### **5.3.1 Kabartonjo Ward**

1. Weirs
2. Spring protection
3. Boreholes
4. Water pans

### **5.3.2 Saimo-Kipsaraman Ward**

1. Weirs
2. Spring protection
3. Boreholes
4. Water pans

### **5.3.3 Saimo-Soi Ward**

1. Water pans/small dams
2. Boreholes
3. Shallow wells
4. Weirs



#### **5.3.4 Barwessa Ward**

1. Boreholes
2. Water pans
3. Shallow wells
4. Weirs
5. Spring protection

#### **5.3.5 Bartabwa Ward**

1. Water pans
2. Boreholes
3. Dam-(Bartabwa dam)
4. Weirs/springs

### **5.4 Baringo South Sub County**

#### **5.4.1 Mochongoi Ward**

##### **5.4.1.1 Upper Mochongoi Ward**

1. River intake/weir
2. Spring protection,
3. Small dams,
4. Water pans
5. Boreholes

##### **5.4.1.2 Lower Mochongoi Ward**

1. Direct River Abstraction (Molo, Waseges and Sandai Rivers)
2. Water pans
3. Boreholes (Isolated cases)

**Note:** The potential of borehole development is low due to high fluoride content.

#### **5.4.2 Mukutani Ward**

1. Lake Baringo and Lake 94
2. Direct River Abstraction (Ol Arabal River)
3. Direct River Abstraction (River Mukutani)
4. Boreholes

#### **5.4.3 Ilchamus Ward**

1. Direct River Abstraction (Perkerra and Molo Rivers)
2. Lake Baringo
3. Boreholes

**Note:** The potential of borehole development is low due to high fluoride content.

#### **5.4.4 Marigat Ward**

##### **5.4.4.1 Upper Marigat Ward (Tugen hills, Sogon highlands and Tenges)**

1. River intake/weir
2. Spring protection,
3. Small dams,
4. Water pans
5. Boreholes

##### **5.4.4.2 Lower Marigat Ward**

1. Boreholes
2. Water pans
3. Minor cases (wiers/dams)

### **5.5 Baringo Central Sub County**

#### **5.5.1 Kapropita Ward**

1. Pipeline Extension
2. Construction of additional storage tanks,
3. Water kiosks, Livestock Water Troughs

Receives water from Kiradich dam (600m<sup>3</sup> Tank)

#### **5.5.2 Kabarnet Ward**

1. Pipeline extension
2. Small dams
3. Weirs
4. Water pans
5. Boreholes

Pipeline extension from Kirandich dam 600m<sup>3</sup> gravity distribution tank. Kerio valley side (Kabimoi, Kimoso, Kapyemit, Chesongo; small dams, intake/weirs, boreholes and water pans). Seguton in peri-urban of Kabarnet town requires upgrade of booster pump and rising main to deliver water to Seguton proposed new 200m<sup>3</sup> gravity distribution R.C tank to benefit Kator/Emgos and Ngelel communities.

### 5.5.3 Sacho Ward

1. Sub-surface dams
2. Intake weirs (highland)
3. Boreholes
4. Water pans (Kapkelelwa)
5. Small dams (middle between highland of Sacho/Tenges and lowlands of Kapkelelwa)

Kapkong system has subsurface dam and balancing tank of 250m<sup>3</sup> (R.C), then to pump house which delivers to booster 1 against the pump head 320 then to treatment works. From the treatment works, it then pumps to 250m<sup>3</sup> against a head 300. The water is then distributed to Kiptagich, Tenges centre, Tulwongoi and Sacho High School.

Other water source is Sacho-Remo Community currently operated and maintained by Sacho High School.

Remo River - Sub-surface dam – Balancing tank (400m<sup>3</sup>) - Booster 1 with composite filtration unit- Booster 2 to maintain storage tank 150m<sup>3</sup> (Masonry) at Sacho hill.

The priority currently is to shift from sub-surface dam that is expensive due to high cost of pumping to small weirs distributed across the highland to take advantage of gravity.

Borehole development in isolated cases along the highland e.g Tandui Primary School, Tabagon Secondary School.

### 5.5.4 Tenges Ward

1. Boreholes e.g Tenges Primary 36m<sup>3</sup>/hr.
2. Weirs e.g Kipsaa weir was damaged by floods and proposed Kipsaa dam. This is common in highlands.
3. Pipeline extension & storage tanks.
4. Water pans (lowlands of Lelkut and immediate neighbourhood).

### 5.5.5 Ewalel- Chap Chap Ward

1. Boreholes (Talai, Seretunin, Kipkaes)
2. Weirs (Kapkiari, Seretunin, Kipkaes, Ng'etmoi)
3. Pipeline extensions
4. Storage tanks

**Note:** There is proposed Kiradich Dam phase II that include the following:

- Main Storage Tank at Pemwai

- Rising main from the Dam 600m<sup>3</sup> to Pemwai
- Distribution to Seretunin, Ossen to Pemwai
- Booster pump from Ossen to Kabartonjo

## 5.6 Tiaty Sub County

### 5.6.1 Churo/Amaya Ward

1. Borehole
2. Spring protection
3. Water Pan

### 5.6.2 Tangelbei Ward

1. Borehole
2. Water Pan
3. River Bed

### 5.6.3 Loyamorok Ward

1. Water Pan
2. Borehole
3. Lake Baringo
4. River Bed

### 5.6.4 Silale Ward

1. Water Pan
2. River bed
3. Borehole.

Note: Boreholes in this area have high Fluoride level

### 5.6.5 Ribkwo Ward

1. Boreholes
2. Spring protection
3. Water pan
4. River bed

### 5.6.6 Kolowa Ward

1. Shallow well
2. Borehole
3. Water pan
4. Kerio River
5. River bed

### **5.6.7 Tirioko Ward**

1. Water pan
2. Borehole
3. River bed
4. Kerio River

## 6. PROJECT ESTIMATED COSTS

### 6.1 Boreholes

SN	Project Component	Estimated Cost (kShs)						Remarks
		Eldama Ravine Community Contribution	Mogotio Community Contribution	Baringo South Community Contribution	Baringo Central Community Contribution	Baringo North Community Contribution	Tiaty Community Contribution	
	Land Acquisition							In Kind
	Hydrogeological	65,000.00- 75,000.00	60,000.00- 70,000.00	65,000.00- 75,000.00	60,000.00- 70,000.00	70,000.00- 80,000.00	80,000.00- 90,000.00	
	Environment and Social Impact Assessment (ESIA)	55,000.00- 65,000.00	50,000.00- 60,000.00	55,000.00- 65,000.00	50,000.00- 60,000.00	60,000.00- 70,000.00	70,000.00- 80,000.00	
	WRUA comments and fees	5,000.00 -10,000.00	5,000.00 -10,000.00	5,000.00 -10,000.00	5,000.00 -10,000.00	5,000.00 -10,000.00	5,000.00 -10,000.00	Depends on the existence of WRUAs
	<b>Application of WRA Authorization for drilling (drilling permit/ Assessment fee)</b>							
	Class A (0-10,000litres/day)	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	
	Class B (10,000-25,000litres/ day)	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	Class B applies to most projects in Baringo County
	Class C (25,000 – 59,000 litres per day)	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	
	Class D (>60,000 litres/day)	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	
	<b>Application of WRA Borehole Permit (water us permit)</b>							
	Class A	0.00	0.00	0.00	0.00	0.00	0.00	
	Class B	7,500.00	7,500.00	7,500.00	7,500.00	7,500.00	7,500.00	Class B applies to most projects in Baringo County
	Class C	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	
	Class D	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	
	Drilling	2.2-2.6 million	2.2-2.8 million	2.3-2.5 million	2.2-2.6 million	2.4-2.8 million	2.5- 3 million	Varies based on Depth
	Equipping and power supply	3,100,000.00	3,000,000.00	3,100,000.00	3,000,000.00	3,200,000.00	3,400,000.00	Varies based on amount of water and Pump Head
	<b>Total</b>	<b>5,437,500.00 to 5,862,500.00</b>	<b>5,327,500.00 to 5,952,500.00</b>	<b>5,537,500.00 to 5,762,500.00</b>	<b>5,327,500.00 to 5,752,500.00</b>	<b>5,747,500.00 to 6,172,500.00</b>	<b>6,067,500.00 to 6,592,500.00</b>	

## 6.2 River/Stream Abstraction

SN	Project Component	Estimated Cost (KShs)							Remarks
		Eldama Ravine	Mogotio	Baringo South	Baringo Central	Baringo North	Tiaty		
	Land Acquisition	Community Contribution	Community Contribution	Community Contribution	Community Contribution	Community Contribution	Community Contribution	Community Contribution	In Kind
	Hydrological	80,000.00-90,000.00	75,000.00-85,000.00	80,000.00-90,000.00	75,000.00-85,000.00	85,000.00-95,000.00	85,000.00-95,000.00	95,000.00-105,000.00	
	Environment and Social Impact Assessment (ESIA)	55,000.00-65,000.00	50,000.00-60,000.00	55,000.00-65,000.00	50,000.00-60,000.00	60,000.00-70,000.00	60,000.00-70,000.00	70,000.00-80,000.00	
	WRUA comments and fees	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	Depends on the existence of WRUAs
	<b>Application of WRA Authorization for abstraction (Assessment fee)</b>								
	Class A (0-10,000litres/day)	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	
	Class B (10,000-25,000litres/day)	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	Class B applies to most projects in Baringo County
	Class C (25,000 – 59,000 litres per day)	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00	
	Class D (>60,000 litres/ day)	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	
	<b>Application of WRA Abstraction Permit (water us permit)</b>								
	Class A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Class B applies to most projects in Baringo County
	Class B	7,500.00	7,500.00	7,500.00	7,500.00	7,500.00	7,500.00	7,500.00	
	Class C	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	25,000.00	
	Class D	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	
	Construction of weir/Intake Works	512,500.00	500,000.00	512,500.00	500,000.00	512,500.00	500,000.00	550,000.00	
	<b>TOTAL</b>	<b>665,000.00 to 690,000.00</b>	<b>542,500.00 to 667,500.00</b>	<b>665,000.00 to 690,000.00</b>	<b>542,500.00 to 667,500.00</b>	<b>687,500.00 to 712,500.00</b>	<b>687,500.00 to 712,500.00</b>	<b>732,500.00 to 757,500.00</b>	

### 6.3 Water Pans

SN	Project Component	Estimated Cost (KShs)							Remarks
		Eldama Ravine	Mogotio	Baringo South	Baringo Central	Baringo North	Tiati		
	Land Acquisition	Community Contribution	Community Contribution	Community Contribution	Community Contribution	Community Contribution	Community Contribution	Community Contribution	In Kind
	Survey and Design	70,000.00-80,000.00	65,000.00-75,000.00	70,000.00-80,000.00	65,000.00-75,000.00	75,000.00-85,000.00	85,000.00-95,000.00	85,000.00-95,000.00	
	Environment and Social Impact Assessment (ESIA)	55,000.00-65,000.00	50,000.00-60,000.00	55,000.00-65,000.00	50,000.00-60,000.00	60,000.00-70,000.00	70,000.00-80,000.00	70,000.00-80,000.00	
	WRUA recommendation and fees	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	5,000.00-10,000.00	Depends on the existence of WRUAs
	Application of WRA Authorization for construction (construction permit/ Assessment fee) (Class A)	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	
	<b>Excavation/Construction of Water and Auxiliary Works</b>								
	15,000m <sup>3</sup>	3,525-3.6Million	3,3-3.45Million	3,525-3.6Million	3,3-3.45Million	3,6-3.675Million	3,675-3.75Million	3,675-3.75Million	
	20,000m <sup>3</sup>	4,7-4.8Million	4,4-4.6Million	4,7-4.8Million	4,4-4.6Million	4,8-4.9Million	4,9-5Million	4,9-5Million	
	<b>TOTAL (15,000m<sup>3</sup>)</b>	<b>3,656,000.00 to 3,756,000.00</b>	<b>3,421,000.00 to 3,596,000.00</b>	<b>3,656,000.00 to 3,756,000.00</b>	<b>3,421,000.00 to 3,596,000.00</b>	<b>3,741,000.00 to 3,841,000.00</b>	<b>3,836,000.00 to 3,936,000.00</b>	<b>3,836,000.00 to 3,936,000.00</b>	
	<b>TOTAL (20,000m<sup>3</sup>)</b>	<b>4,831,000.00 to 4,956,000.00</b>	<b>4,521,000.00 to 4,746,000.00</b>	<b>4,831,000.00 to 4,956,000.00</b>	<b>4,521,000.00 to 4,746,000.00</b>	<b>4,941,000.00 to 5,066,000.00</b>	<b>5,061,000.00 to 5,186,000.00</b>	<b>5,061,000.00 to 5,186,000.00</b>	



## 6.4 Storage Tanks

SN	Type/Volume/ Capacity	Estimated Cost (KShs)						Ticity	Remarks
		Eldama Ravine	Mogofio	Baringo South	Baringo Central	Baringo North			
	<b>Masonry Tanks</b>								
	25m <sup>3</sup> (25,000 litres)	720,000.00	700,000.00	720,000.00	700,000.00	730,000.00	740,000.00		
	50m <sup>3</sup> (50,000 litres)	1,050,000.00	1,000,000.00	1,050,000.00	1,000,000.00	1,075,000.00	1,100,000.00		
	100m <sup>3</sup> (100,000 litres)	1,770,000.00	1,700,000.00	1,770,000.00	1,700,000.00	1,805,000.00	1,840,000.00		
	150m <sup>3</sup> (150,000 litres)	2,300,000.00	2,200,000.00	2,300,000.00	2,200,000.00	2,350,000.00	2,400,000.00		
	225m <sup>3</sup> (225,000 litres)	3,100,000.00	3,000,000.00	3,100,000.00	3,000,000.00	3,200,000.00	3,400,000.00		
	<b>Plastic Tanks</b>								
	5,000 litres	70,000.00	65,000.00	70,000.00	65,000.00	75,000.00	80,000.00		
	10,000litres	120,000.00	110,000.00	120,000.00	110,000.00	130,000.00	140,000.00		

## 6.5 Pipeline Extension

SN	Pipe Size (100m)	Estimated Cost (KShs)								Remarks	
		Eldama Ravine	Mogotio	Baringo South	Baringo Central	Baringo North	Tiati				
	<b>GI (CL B: 6m)</b>										
	4 inch	23,100.00	22,715.00	23,100.00	22,715.00	23,485.00	23,870.00				
	3 inch	15,600.00	15,340.00	15,600.00	15,340.00	15,860.00	16,120.00				
	2 inch	9,300.00	9,145.00	9,300.00	9,145.00	9,455.00	9,610.00				
	1 inch	4,350.00	4,277.50	4,350.00	4,277.50	4,422.50	4,495.00				
	¾ inch	2,850.00	2,802.50	2,850.00	2,802.50	2,897.50	2,945.00				
	½ inch	1,725.00	1,696.25	1,725.00	1,696.25	1,753.75	1,782.50				
	<b>HDPE (PN 10: 100m)</b>										
	4 inch	96,000.00	94,400.00	96,000.00	94,400.00	97,600.00	99,200.00				
	3 inch	64,500.00	63,425.00	64,500.00	63,425.00	65,575.00	66,650.00				
	2 inch	36,750.00	36,137.50	36,750.00	36,137.50	37,362.50	37,975.00				
	1 inch	9,600.00	9,440.00	9,600.00	9,440.00	9,760.00	9,920.00				
	¾ inch	6,900.00	6,785.00	6,900.00	6,785.00	7,015.00	7,130.00				
	½ inch	5,400.00	5,310.00	5,400.00	5,310.00	5,490.00	5,580.00				
	<b>PVC (CL D: 6m)</b>										
	4 inch	4,425.00	4,351.25	4,425.00	4,351.25	4,498.75	4,572.50				
	3 inch	3,300.00	3,245.00	3,300.00	3,245.00	3,355.00	3,410.00				
	2 inch	1,950.00	1,917.50	1,950.00	1,917.50	1,982.50	2,015.00				
	1 inch	585.00	575.25	585.00	575.25	594.75	604.50				
	¾ inch	360.00	354.00	360.00	354.00	366.00	372.00				
	½ inch	277.50	272.88	277.50	272.88	282.13	286.75				

### 6.6 Water Kiosks (WK)/Livestock Water Troughs (LWT)/Community Water Point (CWP)/Tap Stand (TS)

SN	Volume/Capacity	Estimated Cost (KShs)						Remarks
		Eldama Ravine	Mogofio	Baringo South	Baringo Central	Baringo North	Tiaty	
	Water Kiosk (WK)	375,000.00	350,000.00	375,000.00	350,000.00	400,000.00	450,000.00	
	Livestock Water Trough (LWT)	215,000.00	200,000.00	215,000.00	200,000.00	225,000.00	250,000.00	
	Community Water Point (CWP)/Tap Stand (TS)	25,000.00	20,000.00	25,000.00	20,000.00	30,000.00	40,000.00	

### 6.7 Spring Protection

Spring protection falls under the category of specialized works. The works varies considerably from one project to the other. Survey and design need to be done first. However it is estimated to cost Kshs. 500,000.00 (for budgeting purposes).



**CENTRE FOR ENHANCING DEMOCRACY  
& GOOD GOVERNANCE**

📍 Off Kanu street, Next to Citymax Hotel,  
Freehold Estate

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