



MURANG'A COUNTY GOVERNMENT

COUNTY WATER AND SANITATION STRATEGY AND INVESTMENT PLAN (CWSS&IP) 2024-2030

May 2025

COUNTY VISION, MISSION AND MOTTO

Vision

Sustainable development for socio-economic transformation

”

Mission

To transform the County for sustainable development for the benefit of all

Motto

Kamùingì Koyaga Ndirì (Unity is Strength)

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Foreword

I am pleased to present the Murang'a County Water and Sanitation Strategy and Investment Plan (CWSS&IP) for the period 2024-2030. It draws from the Constitution of Kenya 2010 which recognizes access to safe and sufficient water as a basic human right and assigns the responsibility for water supply and sanitation provision to the county governments. Indeed, the Water Act 2016 supports the development of the water strategy for the progressive realization of this right for every person in Kenya. It is, therefore, important for the county to have a clear and focused strategy for effective implementation of this constitutional mandate, besides ensuring inclusive and collaborative action by all stakeholders.

The Strategy addresses access to water within the context of global, continental, regional and national standards and frameworks, including; i) United Nations Agenda 2030 for Sustainable Development, especially Goal 6 which focuses on "Clean Water and Sanitation"; ii) African Union Agenda 2063 which seeks to promote integrated water resources planning and management, infrastructure development, climate change resilience, balanced urbanization and industrialization, iii) East African Community Vision 2050 which champions, water security and availability, ecosystem conservation, capacity building and research and community engagement, iv) Kenya Vision 2030 which is the long-term development blueprint for Kenya that outlines the country's development goals and strategies for achieving them by the year 2030 as well as its off-shoots: the Fourth Medium Term Plan and the Bottom-Up Economic Transformation Agenda (BETA) which prioritize the provision and management of water resources.

The Strategy is in line with the Murang'a County Third Generation CIDP and conforms to our vision for Murang'a County water sector being "a well-connected and efficient water and sewerage system" and the mission: "To develop and manage water resources and sewerage infrastructure for effective service delivery" with regard to the management of the available water resources. The quantity and quality of water for productive and domestic use has continued to be low. Long periods of drought often lead to reduced water tables leading to low yielding boreholes and longer waiting time at the few water points available. Other challenges include the drying up of surface water sources, high siltation and long trekking distances. Consequently, this strategy provides a clear, accountable and transparent road, in an integrated way, for conserving, enhancing, developing and managing the limited available, renewable, water resources on a sustainable basis.

This water sector strategic plan sets out a comprehensive road map which will form a good yardstick that can be used to measure county leadership achievements, a tool for coordinating county water and sanitation sector partners and stakeholder efforts as well as a fundraising tool. I would like to encourage all water sector stakeholders, development partners and communities in Murang'a County to work in harmony for the realization of this strategy towards achieving water for all.

**His Excellency, Dr Irungu Kangata, PhD Governor,
Murang'a County**

Acknowledgements

This Water and Sanitation strategy arises from the need to improve accessibility to safe, affordable, reliable water in adequate quantities as well as improving access to reasonable standards of sanitation in Murang'a County. The improvement of the sector needed a clear and compressive strategic direction.

To develop a realistic, inclusive and equitable strategy, a participatory process was adopted. The County Government of Murang'a, Water Resources Authority (WRA), Kenya National Bureau of statistics, Athi Water Works Development Agency supported in providing vital information to enrich the document. The process also brought on board other public, private and Civil Society Organizations (CSOs) operating at county and national levels in Water, Hygiene and Sanitation to develop this Strategy.

This strategy seeks to address various sector issues relating to policy and institutional frameworks, sustainable water and sanitation services; water safety planning; non-revenue water; integrated/ holistic land and water resources planning and management; water information management system; technological development, resource mobilization and allocation and; gender and social equity.

In the light of the above issues, the Strategy has consequently captured balanced score card, development objectives, key outputs, outcomes, key performance indicators, and required resource (projected, allocated and deficits). The monitoring framework will inform the needs or adequacy of re-planning, implementation, resource mobilization and allocation, coordination among development stakeholders, and reporting among other related aspects. We are thankful to His Excellency the Governor, Dr. Irungu Kang'ata, for his wise leadership and insights provided in preparation of this Plan.

We are also appreciative of the technical assistance provided by the county personnel and stakeholders, especially the County's Department of Water, Irrigation, Environment and Natural Resources under the leadership of Chief Officer, Ms Bridget W. Irungu. In addition, I highly recognize and appreciate the Directorate of Water and Sanitation Services and Directorate of Economic Planning for excellent coordination of stakeholders' involvement in the entire process of development of this strategy. Much thanks to staff of Murang'a County Water and Sanitation Companies, the involved County Directorates, National government Agencies and Civil society organizations for being active and informative in the process.

Ms. Mary Magochi

CECM, Water, Irrigation, Environment and Natural Resources

Dr. Fredric Mbugua

CECM, Public Health and Sanitation

Abbreviation and Acronyms

AWWDA	Athi Water Works Development Agency
CBD	Central Business District
CIDP	County Integrated Development Plan
CWSS&IP	County Water and Sanitation Strategy and Investment Plan
DLIs	Disbursement-Linked Indicators
DTF	Decentralised Treatment Facility
FM	Financial Manager
GoK	Government of Kenya
HH	Household
IPF	Investment Project Financing
K-WASH	Kenya Water, Sanitation and Hygiene
KPHC	Kenya Population and Housing Census
MD	Managing Director
NAWASIP	National Water and Sanitation Investment plan
NRW	Non-Revenue Water
OM	Operations Manual
PBCs	Performance based contracts
PDO	Program Development Objective
PIU	Program Implementation Unit
PMU	Program Management Unit
PPPs	Public Private Partnerships
P for R	Program for Results
RAs	Results Areas
RGS	Rain Gauge Station
SDGs	Sustainable Development Goals
SDWS	State Department of Water and Sanitation
TM	Technical Manager
WASREB	Water Sector Regulatory Board
WRA	Water Resources Authority
WSPs	Water Service Providers
WSS	Water Services and Sanitation
WSTF	Water Service Trust Fund
ESIA	Environmental and Social Impact Assessment

Glossary of Commonly used Terms

Baseline	An analysis describing the initial state of an indicator before the start of a project or programme, against which progress can be assessed or comparisons made.
Indicator	A sign of progress /change that results from an intervention. It measures a change in a situation or condition and confirms progress towards the achievement of a specific result. It is used to measure a project impact, outcomes, outputs and inputs that are monitored during project implementation to assess progress.
Medium term	A span of between three and five years
Outcome	Results generated relative to the objective of an intervention. It describes the actual change in conditions/situation as a result of an intervention output(s)
Output	Immediate result from conducting an activity i.e., goods and services produced.
Programme	A grouping of similar projects and/or services performed by a department or agency to achieve a specific objective.
Project	A set of coordinated activities implemented to meet specific objectives within defined time, cost and performance parameters. Projects aimed at achieving a common goal form a programme.
Sector	Composition of Departments that are grouped together according to services and products they offer/ provide. These Departments produce/offer similar related product/services. They also share common or related operating environment.
Target	Planned level of an indicator achievement.

EXECUTIVE SUMMARY

Murang'a County is one of the 47 Counties created under the Kenya Constitution 2010. It is located in the central region of the Republic of Kenya and lies between latitudes 0° 34' ; 1°7' South and longitudes 36° ; 37° 27' East. The county covers a total area of 2,558.8 Km² , and borders Nyeri to the North, Kiambu to the South, Nyandarua to the West, and Kirinyaga, Embu and Machakos counties to the East. Administratively, the county is divided into seven constituencies and 35 wards, with 9 sub counties, 32 divisions, 118 locations, 294 sub locations and 2,478 villages. The 2019 Population and Housing Census recorded a population of 1,056,640 persons in Murang'a County. The population growth rate is estimated at 1.2 percent per annum.

The water resources available in Murang'a County are Rivers, Shallow wells, springs, Dams, Water pans, Boreholes and Rain water harvesting facilities (roof catchment). There are 12 permanent rivers, 2,740 shallow wells, 95 protected springs, 345 unprotected springs, 85 water pans, 36 dams and 250 boreholes that supply water for domestic, industrial and agricultural use in the county. Domestic water and sanitation services in Murang'a County are offered by five water and sanitation companies which cover a jurisdiction of 97 % of the county population. There are also 15 community operated small scale water supply providers that complement these 5 regulated water companies to supply the rest of the population with water.

The current water demand for Murang'a County stands at 188,500 m³/day. The demand comprises of portable/drinking water, livestock demand, industrial /commercial and Irrigation water demands. On the other hand, our surface water resources endowment stands at 451,006 m³/day mainly comprising of four catchment areas namely Mathioya, Maragua, Sabasasaba and Thika Rivers. Maragua River catchment has been fully exploited and the only viable development of this catchment is by construction of dams to harvest flood flow. Ground water assessment has also been done to determine the potential available for development.

All county and community domestic water service providers produce a total of 87,600 m³ /d to supply 70 percent of the population of Murang'a with portable water. The county requires an investment of Kshs. 48.26 Billion in the next 6 years comprising of 32.61 Billion for universal access to domestic water, 12.42 Billion for improved sanitation, 3.17 Billion for Wash in Health Care facilities investments and 56.7 Million for protection, conservation and management of water catchment areas. In order to bridge the funding gaps and achieve the above by the year 2030, strategic investment proposals have been lined up. The proposals have been accompanied by resource mobilisation strategies which focus on four major portential areas: (i) the annual County Government budget for water sector developmeet, (ii) the WSPs / Water Sector Trust Fund (WSTF) funding models, (iii) Athi Water Works Development Agency (AWWDA) infrastructure development programs and, (iv) Through Public Private Partnerships (PPP).

Murang'a County has a total of 639 public schools comprising of 149 stand-alone ECDE centers, 389 comprehensive schools (primary and junior secondary) and 101 comprehensive schools (primary and junior secondary) with special units. The male pupils are 92,841 (51.3%) while the female pupils account for 88,136 (48.7 %).

Public primary and ECDE institutions that have access to safe water are 521 (81.5%.) Those that access their main source of drinking water from piped water are 314 (49.1%), followed by rain water 164 (25.7%) and protected wells and springs accounting for 43 (6.7%) schools.

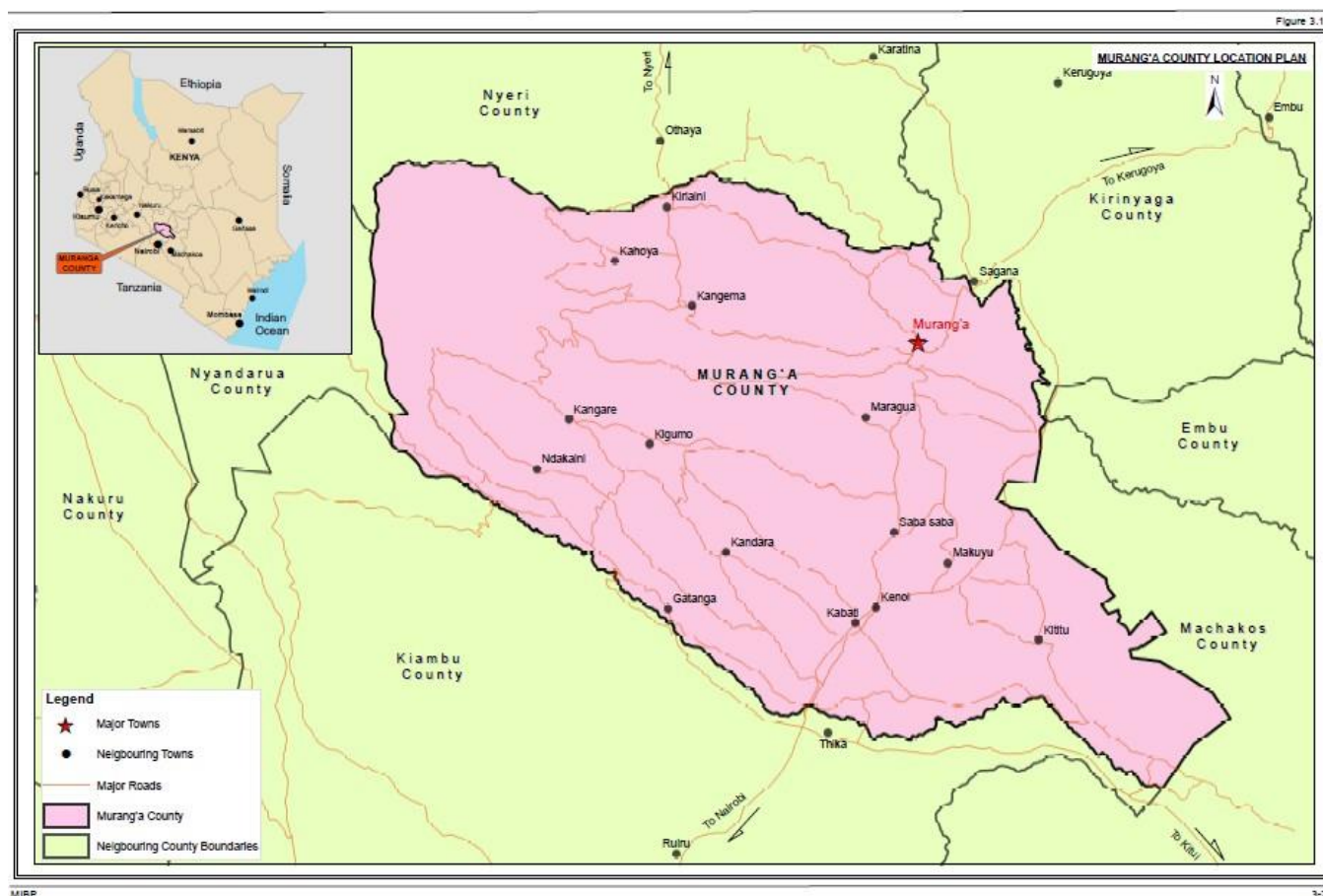
On the other had the county has a total of 151 health Care Facilities,105 HCF access water from piped water supply while 9 have boreholes as their source of water. 37 HCF get water from rain water harvesting. Only 148 are sufficiently supplied with safe water for domestic purposes.

Whilst the First Chapter of the CWSS&IP gives a general social-economic and political context of the county, Chapter two gives a summary of the water, sanitation and hygiene services coverages. Chapter Three summarizes the water and sanitation services institutional structure and financing. Chapter Four provides Planning scenarios and opportunities to achieve county-wide universal access. Chapter Five summarises sector investment plan, institutional reforms and financing strategy while Chapter Six address the Implementation Roadmap, Monitoring and Evaluation and Communication plan.

1.1.2 Demographics , Administrative and Political Units

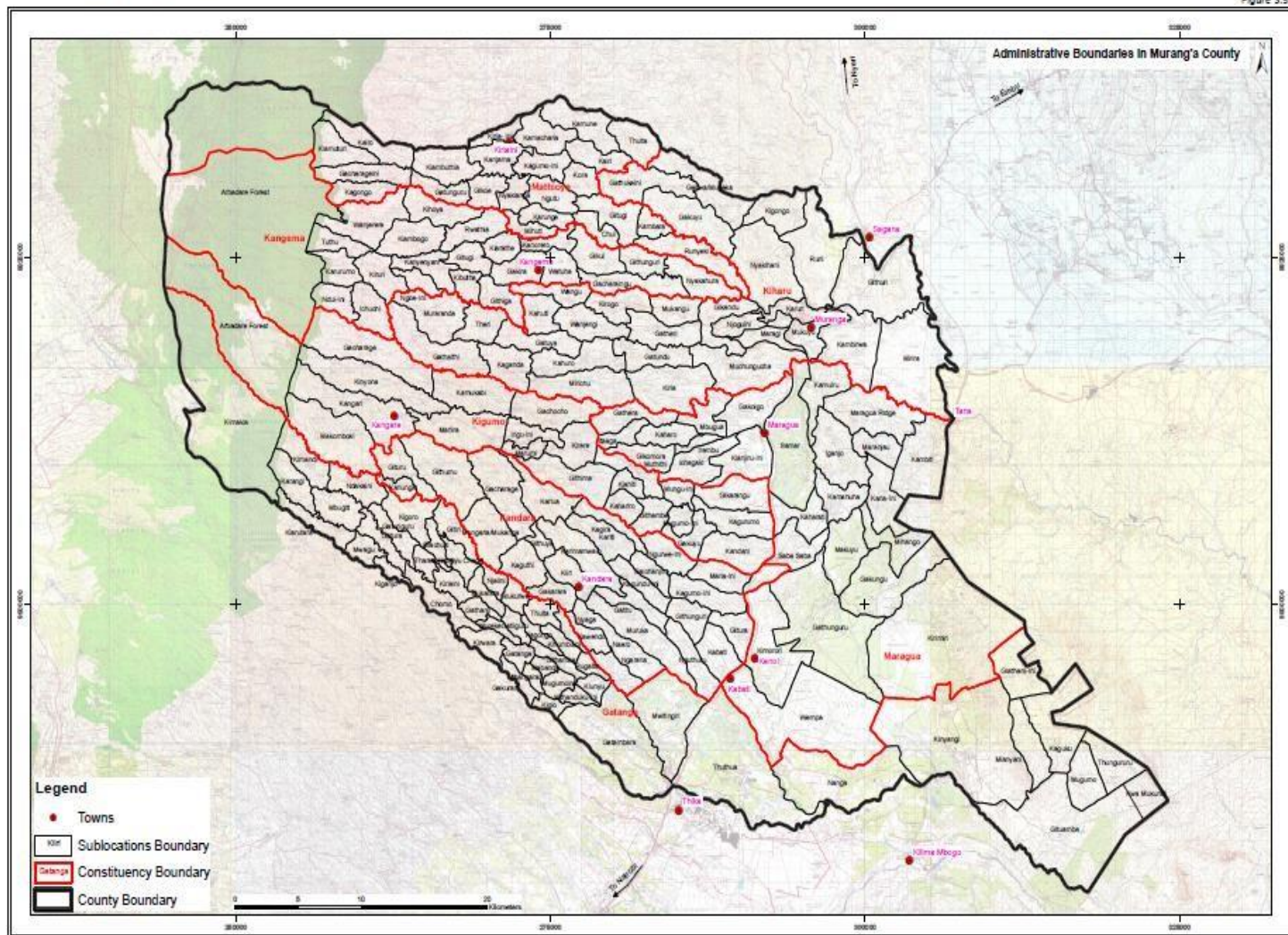
The Murang'a County population as per the KNBS 2019 Population and Housing Census was 1,056,640 persons. With a population growth rate of 1.2 percent per annum, this population is estimated at 1,135,521 in 2025 and is projected to rise to 1,163,103, 1,191,354 and 1,205,736 persons in 2027, 2029 and 2030 respectively. The population consisted of 523,940 Male and 532,669 females with male-female sex ratio of 98 males against 100 females.

The most populated Sub-Counties in the year 2025 are Murang'a South and Kandara with estimated population of about 198,622 and 188,170 persons respectively. Other than those people living in the Aberdares Forest (Forest guards and families), Ithanga has the lowest estimated population of 62,487 persons in the year 2025 and projected to grow to 64,005, 65,559, and 66,351 persons by year 2027, 2029 and 2030 respectively.



Map 1.2 ; Location of Murang'a County

The County average population density as of 2019 population census was 413 persons per square km, this is estimated at 444 persons per square km (2025) and is projected to grow to 455, 466 and 471 persons per square Km by the year 2027, 2029, and 2030 respectively. The most densely populated Sub-County as per the 2025 population estimates is Kandara at 798 persons per square km while Ithanga Sub-County is the least at 219 persons per square Km. In the year 2030, it is projected that Kandara Sub-County population density would be 847 persons per square km while Ithanga Sub-County will grow to 232 persons per square Km as shown in Table 1.1.



Map 1.3 Administrative units of Murang'a County

Table 1.1: Population Projections and Density (by Sub-County)

Sub-County	2019 (Census)			2025 (Estimate)		2027 (Projection)		2029 (Projection)		2030 (Projection)	
	Area (KM2)	Population	Density	Population	Density	Population	Density	Population	Density	Population	Density
Murang'a East	241.00	110,311	458	118,546	492	121,425	504	124,375	516	125,876	522
Kangema	173.46	80,447	464	86,453	498	88,553	511	90,703	523	91,798	529
Mathioya	178.00	92,814	521	99,743	560	102,166	574	104,647	588	105,910	595
Kahuro	169.00	88,193	522	94,777	561	97,079	574	99,437	588	100,637	595
Murang'a South	547.20	184,824	338	198,622	363	203,446	372	208,388	381	210,903	385
Gatanga	313.30	129,843	414	139,536	445	142,925	456	146,397	467	148,164	473
Ithanga	285.70	58,146	204	62,487	219	64,005	224	65,559	229	66,351	232
Kigumo	242.10	136,921	566	147,143	608	150,717	623	154,377	638	156,241	645
Kandara	235.90	175,098	742	188,170	798	192,740	817	197,422	837	199,805	847
Aberdare Forest	173.30	43	0.25	46	0.27	47	0.27	48	0.28	49	0.28
Total	2558.96	1,056,640	413	1,135,521	444	1,163,103	455	1,191,354	466	1,205,736	471

Source: County Economic Planning Office Murang'a, 2024

1.1.3. Population Projections by Age Cohort

According to the 2019 population census, the Age Cohort between 5-9 and 10-14 age groups have the largest populations of 114,251 and 117,758 respectively (see Figure 1.1 and Table 1.2). This Age Cohort between 5-9 and 10-14 age groups population in 2025 is estimated at 122,780 and 126,549 respectively. The same trend if maintained implies that for the same age cohorts, the population will be expected to grow to 125,762 and 129,623 by the year 2027 and 128,817 and 132,771 in the year 2029 and 130,372 and 134,374 in the year 2030. Noteworthy too is that the highest population is within the 15 -49 years" age bracket implying that the focus of socio-economic development must pay special attention to this age bracket.

Table 1.2: Population Projections by Age Cohort

Age Cohort	2019 (Census)			2025 (Estimate)			2027 (Projection)			2029 (Projection)			2030 (Projection)		
	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F
0-4	110,514	55,695	54,819	118,764	59,853	58,911	121,649	61,307	60,342	124,604	62,796	61,808	126,108	63,554	62,554
5-9	114,251	57,564	56,687	122,780	61,861	60,919	125,762	63,364	62,399	128,817	64,903	63,914	130,372	65,686	64,686
10-14	117,758	59,951	57,807	126,549	64,427	62,122	129,623	65,991	63,631	132,771	67,594	65,177	134,374	68,410	65,964
15-19	105,467	55,307	50,160	113,340	59,436	53,905	116,093	60,880	55,214	118,913	62,358	56,555	120,349	63,111	57,238
20-24	75,426	38,214	37,212	81,057	41,067	39,990	83,026	42,064	40,961	85,042	43,086	41,956	86,069	43,606	42,463
25-29	64,798	31,823	32,975	69,635	34,199	35,437	71,327	35,029	36,297	73,059	35,880	37,179	73,941	36,313	37,628
30-34	71,734	35,380	36,354	77,089	38,021	39,068	78,962	38,945	40,017	80,880	39,891	40,989	81,856	40,372	41,484
35-39	68,897	34,374	34,523	74,040	36,940	37,100	75,839	37,837	38,001	77,681	38,756	38,924	78,619	39,224	39,394
40-44	62,972	31,951	31,021	67,673	34,336	33,337	69,317	35,170	34,147	71,000	36,025	34,976	71,858	36,459	35,398
45-49	56,803	28,548	28,255	61,044	30,679	30,364	62,526	31,424	31,102	64,045	32,188	31,857	64,818	32,576	32,242
50-54	45,716	22,188	23,528	49,129	23,844	25,284	50,322	24,424	25,899	51,544	25,017	26,528	52,167	25,319	26,848
55-59	42,222	20,187	22,035	45,374	21,694	23,680	46,476	22,221	24,255	47,605	22,761	24,844	48,180	23,035	25,144
60-64	30,447	14,624	15,823	32,720	15,716	17,004	33,515	16,097	17,417	34,329	16,488	17,840	34,743	16,688	18,056
65-69	28,212	13,356	14,856	30,318	14,353	15,965	31,055	14,702	16,353	31,809	15,059	16,750	32,193	15,241	16,952
70-74	24,657	11,534	13,123	26,498	12,395	14,103	27,141	12,696	14,445	27,801	13,005	14,796	28,136	13,161	14,975
75-79	14,953	5,793	9,160	16,069	6,225	9,844	16,460	6,377	10,083	16,859	6,532	10,328	17,063	6,610	10,453
80-84	10,123	3,811	6,312	10,879	4,096	6,783	11,143	4,195	6,948	11,414	4,297	7,117	11,551	4,349	7,203
85-89	6,164	2,163	4,001	6,624	2,324	4,300	6,785	2,381	4,404	6,950	2,439	4,511	7,034	2,468	4,566
90-94	2,978	866	2,112	3,200	931	2,270	3,278	953	2,325	3,358	976	2,381	3,398	988	2,410
95-99	1,656	451	1,205	1,780	485	1,295	1,823	496	1,326	1,867	508	1,359	1,890	515	1,375

100+	847	152	695	910	163	747	932	167	765	955	171	784	967	173	793
Age NS	14	8	6	15	9	6	15	9	7	16	9	7	16	9	7
Inter-Sex	31			31			31			31			31		
Total	1,056,640	523,940	532,669	1,135,519	563,054	572,434	1,163,100	576,730	586,339	1,191,350	590,739	600,580	1,205,732	597,870	607,831

**Intersex population is excluded from the table since it is too small to be distributed by age and projections*

Source: County Economic Planning Office Murang'a, 2024

1.1.4 Population Projections by Urban Area

The most populated urban areas in the County are Kenol and Murang'a Towns, with the population estimated at 44,086 and 43,314 persons respectively as reported in the 2019 Population and Housing Census. This population is estimated at **47,376** and **46,548** persons in 2025 and projected to rise to 50,306 and 49,426 persons by the end of the plan period 2030 as shown in Table below.

The County Government has planned to provide efficient and effective basic human needs, such as, water and sewer systems. In so doing, Murang'a and Maragua urban areas have been combined to form one municipality namely Murang'a Municipality to ensure the provision of these services are efficiently and effectively delivered. The County has also created Kangari and Kenol Municipalities for Kangari and Kenol urban areas respectively.

1.1.5 Economic growth and urbanization trends.

Murang'a County is experiencing increasing urbanisation. This is driven by population growth and economic shifts with a focus on smart city development. The trends indicate a shift towards larger urban centres and the development of new towns. The people living in urban centres currently stand at 27 percent. On the other hand, urbanization rate is 4.3 percent per annum. Projections indicate that by year 2050 over 50 percent of Muranga residents will be living in urban areas.

The growth is being fueled by factors like establishment of government offices, the A 2 Road corridor and the potential of future development of towns like Kenol. Murang'a's geographical location and demographic factors make it vulnerable to the impacts of climatic change, which could further impact on urbanisation trend. People tend to move away from landslide and flood prone areas and settle in upcoming urban centres. Murang'a county economy is predominantly driven by agriculture, with a focus on crop and livestock production. In the year 2022, the county had a Gross Domestic Product of Kshs 247,592 million which represents the total market value of all final goods and services produced within Murang'a County during that year. The county contributes on average 2.0 percent of the National Gross Value added while the per capita Gross Value Added (GVA) in Murang is Kshs. 138,192 with a poverty rate of 26.7 percent.

Table 1.3: Population Projections by Urban Area

Urban Area	2019 (Census)			2025 (Estimate)			2027 (Projection)			2029 (Projection)			2030 (Projection)		
	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F
Murang'a	43,314	21,056	22,258	46,548	22,628	23,920	46,355	23,178	23,178	47,481	23,740	23,740	49,426	24,027	25,399
Maragua	8,577	4,006	4,591	9,239	4,305	4,934	8,819	4,410	4,410	9,033	4,517	4,517	9,810	4,571	5,239
Kenol	44,086	21,209	22,876	47,376	22,792	24,584	46,692	23,346	23,346	47,826	23,913	23,913	50,306	24,202	26,104
Kangari	4,096	1,919	2,177	4,402	2,062	2,340	4,225	2,112	2,112	4,327	2,164	2,164	4,674	2,190	2,484
Kiriaini	3,779	1,742	2,038	4,062	1,872	2,190	3,835	1,918	1,918	3,928	1,964	1,964	4,313	1,988	2,326
Sabasaba	2,438	1,130	1,308	2,620	1,214	1,406	2,488	1,244	1,244	2,548	1,274	1,274	2,782	1,289	1,493

Source: County Economic Planning Office Murang'a, 2024

1.1.6 Administrative Divisions (Sub-Counties, Divisions, Locations)

The County is divided into Nine (9) Sub-Counties; Gatanga, Ithanga, Kahuro, Kandara, Kangema, Kigumo, Mathioya, Murang'a East and Murang'a South. The County has 32 Divisions, 118 Locations and 294 Sub- Locations. Table 1.3 illustrates the administrative units, the land area, number of Divisions, the number of Locations, and number of Sub-Locations in each Sub-County.

Table 1.4: Area (Km²) by Sub-County

S/No.	Sub-County	No. of Divisions	No. of Locations	No. of Sub-locations	Area (Km2)
1.	Gatanga	5	19	51	313.30
2.	Ithanga	2	6	14	285.70
3.	Kahuro	3	12	32	169.00
4.	Kandara	3	11	29	235.90
5.	Kangema	4	11	33	173.46
6.	Kigumo	3	16	36	242.10
7.	Mathioya	5	15	31	351.30
8.	Murang'a East	4	14	29	241.00
9.	Murang'a South	3	12	37	547.20
	Total	32	118	294	2,558.96

Source: County Economic Planning Office Murang'a, 2024

1.1.7 County Government Administrative Wards by Constituency

The County is divided into seven (7) Constituencies; Gatanga, Kandara, Kangema, Kigumo, Kiharu, Maragua, Mathioya. The County is made up of 35 wards and 2,478 Villages respectively. Kiharu Constituency has the most number of Villages (513) while Kangema (203) has the least. Table 1.4 illustrates the administrative units, number of Wards, and number of Villages in each Constituency.

Table 1.5: County Government Administrative Wards and Villages by Constituency

S/No.	Constituency	No. of Wards	No. of Villages
1.	Gatanga	6	508
2.	Kandara	6	273
3.	Kangema	3	203
4.	Kigumo	5	359
5.	Kiharu	6	513
6.	Maragua	6	324
7.	Mathioya	3	298
	Total	35	2,478

Source: County Development Planning Office Murang'a, 2024

Social-Economic Profile

According to the KNBS GCP 2019, Murang'a County contributes 2.3 % to the National GDP. The main economic activity of Murang'a County is agriculture. Most of the residents (80%) practice food crop farming (maize and bananas) majorly in the lowlands, cash crop farming (tea and coffee) mainly in the highlands, livestock rearing and dairy farming are also prominent in the county.

The county has minimal mining activities such as quarrying which is practiced in some parts. Quarrying activities include sand harvesting, excavation of building blocks and ballast and extraction of clay soil for brick making and pottery. The main tourist attraction sites in the county are the Aberdares National Park and cultural heritage sites that have a rich history on the origins of the Agikuyu people. Such sites are at Mukurwe wa Nyagathanga and Karia Ka Mbari ya Ngware. Majority of the residents belong to the mainstream Christian denominations including Catholic and Protestants.

1.1.8 Gender disaggregated data –Murang’a County

a) Population Distribution (2023 Estimates)

- Total Population -1.2 million
- Male- 49%
- Female- 51%

b). Education (2022/2023)

Primary School Enrollment*

- Boys: 50.2%
- Girls: 49.8%

Secondary School Enrollment

- Boys: 48%
- Girls: 52% (higher transition rates for girls)

Adult Literacy (15+ years):

- Male: 85%
- Female: 80%

c). Employment & Labor Force

Formal Employment

- Male: 55%
- Female: 45%

d) Agriculture (Main Economic Activity)

- Female participation: 60% (especially in tea/coffee farming)
- Male participation: 40% (more in commercial farming)

e) Health Indicators

Life Expectancy

- Female: ~68 years
- Male: ~64 years

HIV Prevalence (15–49 years)

- Female: ~5.2%
- Male: ~3.8%

Access to Maternal Health Services

- 78% of women attend at least 4 antenatal visits.

f) Political Representation

County Assembly (2022)

- Male MCAs: 70%
- Female MCAs: 30% (below the 2/3 gender rule)

Women in Leadership

- Only 20% hold senior county government positions.

g) Gender-Based Violence (GBV) Reports (2023)

Reported GBV Cases: 1,200 annually

- 85% of survivors are women/girls.
- 15% are men/boys.

h) Major Issues

Women dominate unpaid care work.

- Men have higher land ownership rates (65% vs. 35% for women).
- Youth Unemployment: Higher among young women (38%) than men (32%).

1.1.9 Women in Water and Sanitation

Here's a detailed gender analysis focusing on:

1. Women's participation in water management committees
2. Gender impacts of sanitation deficiencies
3. Differing water needs for household activities

. Women's Participation in Water Management Committees Current Representation (2023 Data)

a) County Water Boards:

- Male members 75-80% (hold leadership roles like chairpersons).
- Female members 20-25% (mostly in secretarial or advisory roles).

b) Community Water Committees (CWC)

- Women's participation -30% (but only 10% hold decision-making positions).
- Barriers Cultural biases, lack of technical training, and time constraints due to domestic roles.

c) Impact of Low Participation

- Male-dominated priorities; Focus on large-scale irrigation over household needs.
- Underrepresented needs: Women's concerns (e.g., proximity, safety, MHM) are often ignored.

1.1.10 Climate Change Impacts on Water Resources and Link to Social Equity in Murang'a County

Climate change is exacerbating water scarcity and inequality in Murang'a County, with marginalized groups (women, smallholder farmers, and rural communities) disproportionately affected. Below is an analysis of:

a) Climate change impacts on water resources

How climate resilience strategies can promote social equity

Climate Change Impacts on Water Resources

a) Declining Water Availability

b) Reduced Rainfall: Murang'a has experienced a 20% decrease in long rains (March-May) over the past decade, affecting river flows and groundwater recharge (Kenya Meteorological Department, 2023).

c) Drying Rivers: Key Rivers (Maragua, Irati, Murang’a) have seen 30-40% reduced flow in dry seasons, worsening shortages.

d) Increased Water Competition & Conflicts

-Farmers vs. Households

-Men-dominated irrigation (coffee/tea farming) consumes 60% of water, leaving less for domestic use.

- Women report 35% more time spent searching for water during droughts (SNV Kenya, 2022).

Inter-Community Tensions: Conflicts over water points (e.g., between Kiharu and Kandara sub-counties) have risen by 25% since 2020 (Murang’a Peace Committee).

e) Poor Water Quality & Health Risks

Pollution: Floods (increasing due to erratic rains) contaminate 45% of shallow wells with runoff chemicals (Ministry of Health, 2023).

f) Disease Burden: Women and children suffer more from waterborne diseases (cholera, dysentery) due to reliance on unsafe sources.

1.1.11 Climate Resilience Strategies & Social Equity Linkages

To address these challenges, Murang’a County has implemented resilience strategies with varying equity impacts such as;-

a) Water Conservation and Storage as illustrated in the table below;-

Table 1.6 Water Conservation and Storage

Strategy Gaps	Impact	Social Equity
Rainwater Harvesting (Women benefit most)	Reduced fetching time (50% adoption in women-led Households).	Poor households lack Storage tanks.
Sand Dams	Equitable access, 12 dams built since 2020, serving 30,000+ people	Maintenance often falls on women’s groups
Afforestation	Youth/women employed in county-led tree-planting (5,000 jobs created)	Land ownership disputes limit participation

b) Climate-Smart Agriculture (CSA)

- Drip Irrigation: Reduces water use by 40%, but <15% of female farmers access subsidies (vs. 35% of men).

-Drought-Resistant Crops: Women grow beans/sweet potatoes, but markets are male-dominated.

c) Governance & Equity-Focused Policies

- Murang’a Climate Fund (2022): Allocates 30% of funds to women/youth-led water projects.

- Gender-Responsive Early Warning Systems: SMS alerts on droughts/floods reach 65% of women (up from 30% in 2019). (Sources: Murang'a County Climate Action Plan 2021-2025, UNDP Kenya)

1.1.12. Key Challenges to Equity in Climate Resilience a) Gender Gaps in Decision-Making:

- Only 2 out of 15 County Climate Committee members are women.

b). Unequal Resource Access

- Women own <10% of land with water rights, limiting their adaptation options.

c). Funding Shortfalls

- 80% of resilience projects focus on infrastructure (e.g., dams), not social equity programs.

Recommendations for Equitable Climate Resilience

a) Strengthen Women's Leadership

- Reserve 50% of water committee seats for women (as per Kenya's Constitution).

b) Targeted Subsidies

- Provide low-interest loans for women's rainwater harvesting systems.

c) Community-Based Adaptation

- Train women/youth in soil conservation and agroforestry.

d) Climate Justice Advocacy

- Integrate gender/disability assessments in all county resilience projects.

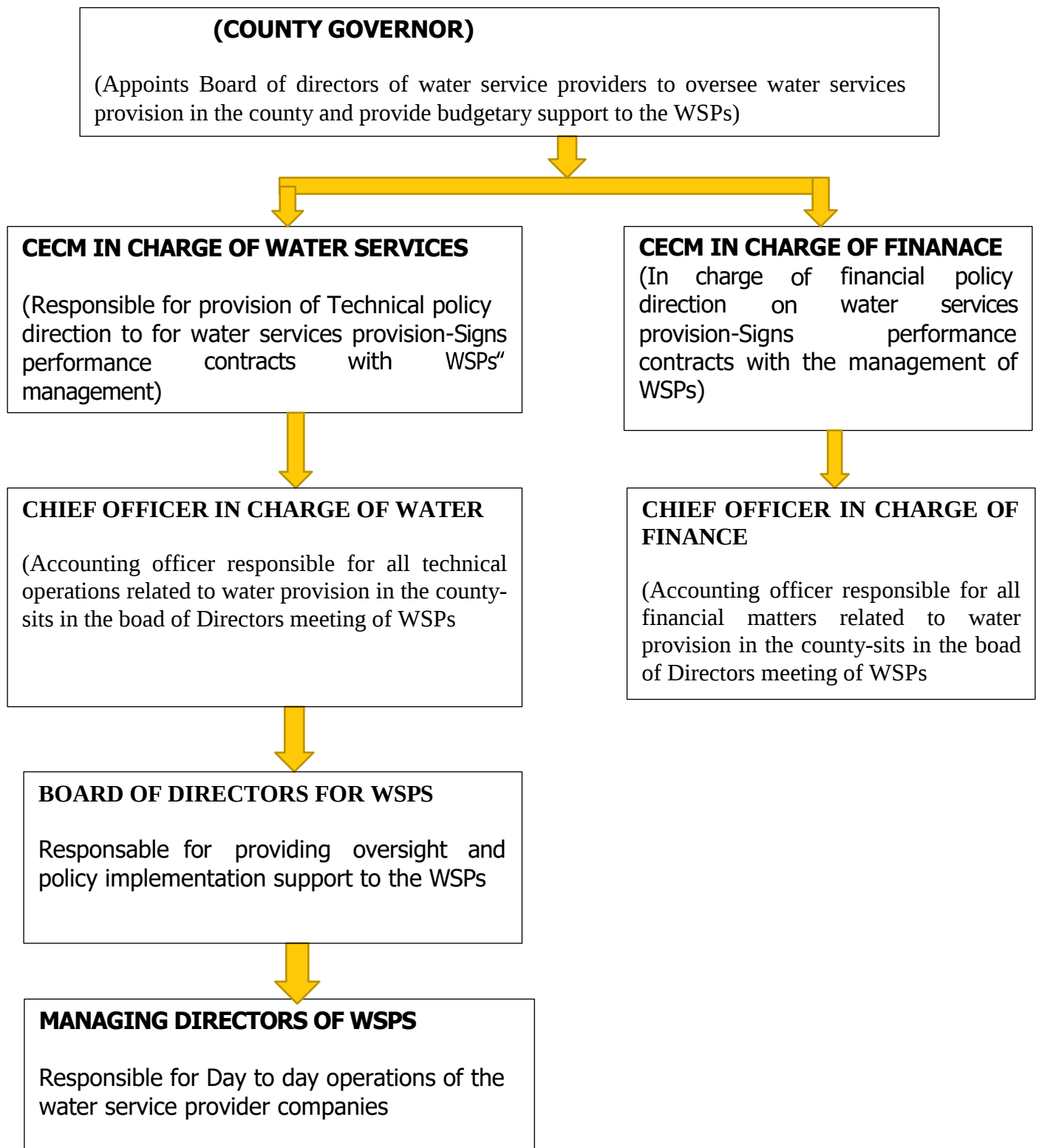
(Policy Sources: Kenya's National Climate Change Action Plan, Murang'a County WASH Policy)

Climate change is worsening water scarcity in Murang'a, but equitable resilience strategies—like inclusive governance, gender-responsive funding, and community-led conservation—can reduce disparities. Empowering women and marginalized groups in water management is critical for long-term climate adaptation.

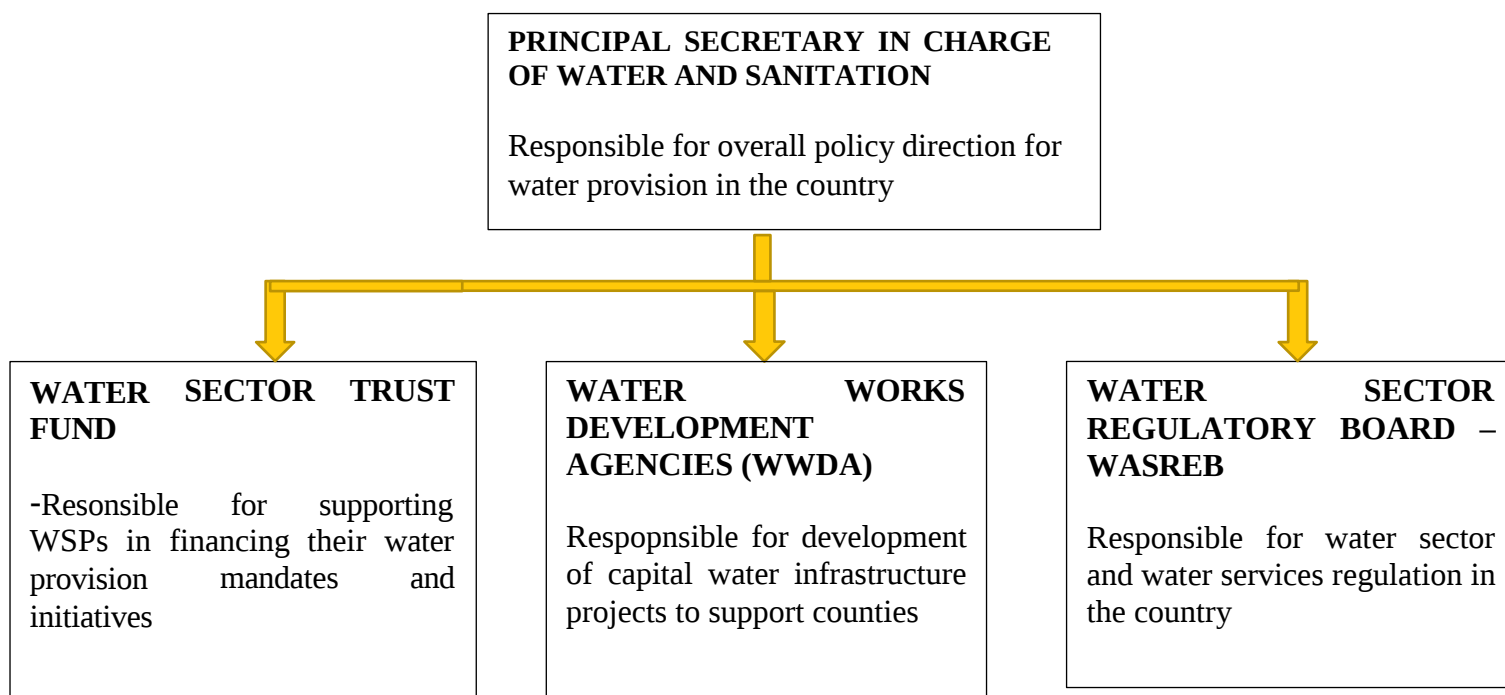
1.1.13 Coordination of the County and National Government Agencies

There exists a coordinated disaster management team at the county. That handles climate change related hazards and emergencies. The county commissioner is the head of the county disaster management team while the Governor is the alternate chair. Membership is drawn from different stakeholders and departments including, environment and climate change, meteorology, water, lands, roads, forestry, administration and security. The private sector is brought on board during mitigation stage.

Governance structure of water provision in the county



1.1.14 Water Services and Regulatory Support Structure at the National Level



1.1.15 Coordination of the County and National Government Agencies

There exists a coordinated disaster management team at the county. That handles climate change related hazards and emergencies. The county commissioner is the head of the county disaster management team while the Governor is the alternate chair. Membership is drawn from different stakeholders and departments including, environment and climate change, meteorology, water, lands, roads, forestry, administration and security. The private sector is brought on board during mitigation stage.

1.1.16 Role of women leadership in water and sanitation service delivery

The department of water at the county level is entirely led by women. The chair of the water committee in the county assembly who is in charge of oversight of water services in the county is a lady, the CECM in charge of policy direction is also a lady. The chief officer who is the accounting officer in all matters of the water sector at the county is a woman as well.

1.1.17 Role of the private sector in water and sanitation service delivery

The private sector plays an important role in the water sector. Representatives of the business communities, professional bodies, women groups, youth are recruited as directors in all the Boards of management for water and sanitation companies. They are part of the decision-making process in the water and sanitation companies operating in Murang'a County.

1.1.18 Key Environmental, Social –Political factors affecting water and sanitation service delivery

- **Environmental factors-**

During rainy seasons, water sources become more turbid because erosion is high, this increases the cost of water treatment. On the other hand, water consumption from conventional sources decrease because consumers tend to use rain water from roof instead of piped water.

Floods and land slides result in pollution of water sources and disruption of water services provision because water infrastructure is sometimes cut off in some areas.

This results to decreased revenues for the water companies. When there is drought, water resources decrease as water levels in levels go down. There is not enough water available for treatment. Water demand becomes high and complaints of lack of water arise. Rationing programs are introduced in water services delivery. Since there are no other sources of water other than piped water, revenues for water and sanitation service provided increase.

- **Social –Political Factors affecting delivery of water and sanitation services**

The terrain of Murang'a County is very diverse. Water sources originate from the higher elevation where rainfall is high. The people living there are the custodians of forest and water catchment areas and they feel that they deserve special treatment when it comes to payment of water bills. Their political leaders join the cue and all demand that they should be subject to lower water tariffs. Alternatively they feel entitled to irrigate with domestic water with impunity.

They were the entry point when the water supply infrastructure was first developed. The community demand to be treated differently with those living downstream who also are supplied with water from the higher areas. This sometimes has caused conflicts where destruction of water infrastructure is destroyed when their demands are not accommodated. Water shortages downstream occur. The community downstream also threaten to block roads, power, health care facilities that benefit the communities living upstream in retaliation.

This is where political leaders come together to solve these malignant conflicts that threaten the supply of water in the county. The conflict is triggered when water tariffs are raised by the regulatory Authority WASREB to meet the cost of production, delivery and supply of water services to the people. Other communities feel that water supply issues should be left to the where they charge their own determined tariffs as opposed to the National regulator determining how much they should pay for water services. Again, the political leaders are behind these conflicts. Sometimes enforcement by security agencies are called to restore order in the sector. This is where both the National and County dispute resolution teams come together to seek amicable solutions.

- **Community engagement, stakeholder participation and public perceptions**

Public participation exercises are normally conducted when a water company is seeking renewal of a service provision licence, when water tariffs are proposed for adjustment, when a capital expenditure project is being proposed, when a new legislation relating water service provision are being proposed policies, Acts, etc. The general public perception is that the county government is capable and willing to provide water and

sanitation services to the general public. The community is also willing to pay for water and sanitation service where tariffs are friendly to them.

- **Gender specific water and sanitation needs**

In Murang'a county women are the ones charged with fetching water for domestic purposes when water is brought closer to the homestead, women save time and resources that could have been used to travel long distances where streams and rivers are located. Acceptability to water at their homestead allow them to engage in other economic activities hence raising their social economic status. The girl child can now concentrate on education like the boy child. Sanitation standard for women and girls improves significantly when sufficient and affordable water are close to them. This reduces occurrence of water borne diseases and saves money which could otherwise be used for treatment.

1.1.19 Existing laws, policies and standards guiding water and sanitation service delivery.

In Kenya, many laws and regulations have been enacted to govern water and sanitation services under the national and county levels. In addition some internationally recognized standards are used in water service provision such as; world health organization drinking water standards. Below are some of the laws and regulations governing water and sanitation services deliveries

1.1.19.1 The Constitution of Kenya 2010

Article 43(1) (d), of the Constitution of Kenya 2010, provides for the right to clean and safe water in adequate quantities to every person. It is the role of the government to provide, protect, and uphold this social economic right.

Part II of the Fourth Schedule further specifies the role of devolved functions of the County Government. The County Government has a mandate to implement specific National Government policies on natural resources and environmental conservation, including soil and water conservation and forestry. It is the role of the County Government to implement inter alia the National Water Act 2016.

Similarly, the schedule confers the County the mandate to provide for water and sanitation services. This implies that it is the obligation of the county to legislate on this functional area.

1.1.19.2 The County Government Act, 2012

This act establishes the County Governments and in Section 5 expressly states that the functions of the County Government are as set out in the Constitution of Kenya 2010. The

Act gives the County Government authority to govern and create legislation on their functional areas.

1.1.19.3 Kenya Vision 2030

Kenya Vision 2030 is based on the three pillars, namely, economic, social, and political interests. It recognizes that water is necessary for enabling the Vision to ensure that Kenyans have access to water and improved sanitation by 2030.

The Vision specifically proposes to address the challenges relating to Water security, catchment management, increased water demand and better quality water.

The objective of the social economic pillar inter alia is to ensure water and improved sanitation access to all by 2030.

1.1.19.4 The National Water Act 2016

The purpose of the National Water Act 2016 was to provide for regulation, management, and development of water resources and water and sewerage services. County Government has a mandate to implement the provisions of this Act. Further, the Act requires County Governments to establish water services providers. Pursuant to Section 158 of the Act, County Governments shall comply with the standards of commercial viability set out by the regulatory Board.

The County Government is mandated to develop strategies for the management of the water service providers.

Additionally, every County Government is obligated to put in place measures for the provision of water services to rural areas, which is considered not to be commercially viable for the provision of water services. The measures referred to in subsection (2) include the development of point sources, small scale piped systems, and stand pipes which meet the standards set by the Regulatory Board and which may be managed by the community associations, public benefits organizations, or a private person under a contract with the County Government. The Act provided for the formulation of the regulatory body „WASREB“ and transferred responsibility for water services provision to county governments while ensuring national oversight. The water ct also outlined consumer protection and tariff regulations stressing the rights of consumers and quality water services provision and established dispute resolution's mechanisms.

1.1.19.5 Water sector regulations 2021

The regulations provide implementation guideline for the water Act 2016.

1.1.19.20 Sessional Paper No. 01 of 2021 on National Water Policy

This paper was developed by the Ministry of Water, Sanitation and Irrigation and aims at building on achievements of the water sector reforms over the years and moving it to the next level of development in order to contribute to the National Goals and realization of the sustainable development goals.

1.1.19.21 Murang'a County Integrated Development Plan (CIDP) 2023 – 2027

Increasing availability and access to water is one of the County development priorities, this will be realized through three major development initiatives: Development of water source works, water distribution, and construction of boreholes.

1.1.19.2 Murang'a County Government spatial plan

The spatial plan entrench the water sector development programmes into the spatial context of Muranga County.

1.1.19.23 Murang'a County Water Act 2025

The act domesticate all the rules and regulations governing the water sector and assigns the County Executive Member (CEC) in charge of water the full responsibility of formulating policies guiding the water sector operations in the county. As county government agencies the Water service providers are required to sign annual performance contracts with the CEC . The Governor of the county appoints the members of the board of directors of all water service providers in the county to ensure oversight is adequately done. Regulation and quality surveillance is a mandate of the Water Sector Regulatory Board which complements county monitoring and evaluation exercise which is done on a quarterly basis.

1.1.20 Alignment with National Policies and Global Commitments

Water service provision roles align with the global commitment such as sdg six where provision of water and sanitation for all is required. The laws and regulation also align with Africa agenda 2063, Kenya vision 2030, national water and sanitation investment programme among other national policies.

1.1.21 M&E reporting data and information management framework at county level.

This is the plan to track the progress of the water and sanitation services provision to ensure we meet policy goals and address any necessary variation or adjustments that may occur.

Reporting Mechanism

The management of each WSP will be reporting to the CEC water and sanitation quarterly, mid- term and annually on the implementation progress of water and sanitation programme and project.

M& E indicators

- Records of household connected with water and sanitation
- Water coverage levels in respective supply areas
- Sanitation coverage levels in respective supply areas
- Water quality analysis reports
- Revenue generated
- Non revenue water levels

- Risk assessment, mitigation and adaption measure taken

1.2.0. Water in the County Economy

1.2.1 Role of water in Economic Planning and County Development

Objective

Water plays an important role in Muranga county economic planning. It is an enabler in all development sectors objective including health and sanitation, agriculture, manufacturing among others. Crop production through irrigated agriculture is a large enterprise in the county. The expansive hospitality industry heavily rely on domestic water supply by the county owned WSPs.

Industrial development including coffee pulping, milk processing factories, agricultural processing factories among other value addition enterprises depend on water supply managed by the county government.

1.2.2 Water conservation and sustainability measures

Muranga county Government has a water conservation programme where both fruits and indigenous tree are planted every financial year. In collaboration with Kenya forest service county owned WSPs participate in water catchment protection and conservation initiatives which involves planting of indigenous trees inside forest, rehabilitation of riparian areas and fencing of wetlands.

1.2.3 Impact of water supply on production and economic sustainability

Water supply impact heavily on agriculture value chain activities such as milk processing. This earns Muranga residence huge sums of money there by improving their social and economic status. Mango and avocado processing industries which heavily depend on water supply have expanded over the year due to availability of water. Nutrition levels in Muranga have improved significantly as seen in reduction of the number of stunted, under weight and obese children in Muranga.

This is because of availability of water for food growth and domestic water for sanitation. Good health and improved social economic growth testify to the positive impact of water supply over the year.

1.2.4 Constraints to economic growth due to water access, quality and management challenges.

Several economic challenges occur due to lack of domestic water supply. In the lower areas of Muranga, domestic water supply coverage is barely 30 percent. Residents depend on unsafe water for domestic purposes and there is no water for irrigation. Occurrence of water borne diseases is high resulting to low productivity.

Due to lack of irrigation water agricultural activities are minimal. This reduces their incomes significantly and poverty levels are high.

Huge investments in water supply infrastructure are required to mitigate these challenges. Management of water supply providers are also affects social economic development for people living in marginal areas. Lack of resources result in WSPs neglecting the areas that are considered arid and semi- arid where ability to pay for water services cannot be guaranteed.

Existing laws on water service provision demand that water supply provision should be done on commercial viability basis. This works against low income areas which tend to be sidelined in water supply provision as they are considered commercially not viable.

1.2.5 Risks and opportunities related to water resource availability and climate variability

1.2.5.1 Impacts of climate change on water availability and service provision

The table below illustrates climate change impacts on water availability

Table 1.7: Impacts of climate change on water availability and service provision

Water Source	Climate Risk	Vulnerability	Severity	Frequency	Key Impacts
Rivers	Drought	High	High	Seasonal	Rivers dry up during prolonged dry spells, leading to reduced water availability for domestic and irrigation use.
	Flooding	Medium	Medium to High	Occasionally (Heavy Rain Seasons)	Riverbanks overflow, causing contamination of water and damage to intakes.
	Landslides	Medium	High	Frequent in upper zones	Landslides block or divert river flows and destroy nearby intake infrastructure.
Water Pans / Dams	Drought	High	High	Seasonal	Water levels drop significantly; evaporation increases during heatwaves.
	Flooding	High	Medium to High	Occasionally	Overflow or embankment breaches can damage the structure and downstream areas.
	Landslides	Low to Medium	Medium	Localized	Siltation from upstream landslides reduces capacity.
Springs	Drought	Medium	Medium	Seasonal	Springs dry up or significantly reduce flow during dry periods.

	Landslides	Medium to High	Medium to High	Frequent in hilly zones	Landslides block access or destroy spring protection
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					structures.
Boreholes	Drought	Low to Medium	Medium	Increasing	Lowering of groundwater table requires deeper drilling and increases pumping costs.
	Flooding	Low	Low to Medium	Rare	Risk of surface contamination during floods if poorly sealed.
Rainwater Harvesting	Drought	High	High	Seasonal	Unreliable due to erratic and reduced rainfall patterns.
	Flooding	Medium	Medium	Occasionally	Overflows may damage storage tanks; contaminated runoff reduces water quality.
Pipelines / Intakes	Landslides	High	Very High	Frequent in highlands	Destruction of pipelines and water intakes during slope failures.
	Flooding	High	High	Occasionally	Intakes submerged or blocked; infrastructure washed away.
Shallow Wells	Drought	Medium to High	Medium	Seasonal	Water table drops, making wells go dry.
	Flooding	Medium	Medium	Occasionally	Contamination due to surface runoff and latrine overflow.

1.2.5.2 Assessment of risks and opportunities related to climate variability and water security for economic sustainability.

Murang'a County is increasingly experiencing the impacts of climate variability, which are manifesting in diverse forms across its varied landscape. These impacts are significantly affecting water service provision, agriculture, and overall community resilience. The primary climate-related risks include drought, flooding, and landslides each with distinct geographical and infrastructural consequences.

Drought and erratic rainfall are major concerns affecting nearly all wards across the county. These conditions have led to widespread water scarcity, depletion of rivers and water pans, and frequent rationing of available water resources. The problem is especially

severe in areas like Ithanga and Kakuzi, where sandy soils exacerbate the situation by limiting water retention. This has made access to clean and sufficient water increasingly difficult, with many communities walking long distances to fetch water. Additionally, drought contributes to reduced water levels at intake points, straining the capacity of water service providers to meet growing demand and often resulting in consumer complaints.

Flooding, another major climate-related hazard, is particularly problematic in lower-lying areas such as Maragua and Kiharu. Floodwaters often submerge water intakes and damage critical infrastructure, leading to contamination of water supplies and higher treatment costs. In some cases, these floods render water facilities inaccessible altogether, hampering service delivery. Flooding has been strongly linked to the effects of climate change and presents significant challenges for water management in these areas.

Landslides are a recurring issue in the highland and hilly regions of the county, particularly in Mathioya, Kangema, Kigumo, Ichagaki, Muguru, and Nginda Wards. These landslides frequently disrupt water service delivery by destroying infrastructure such as pipelines and intakes. The cost of repairing and restoring these systems is high, especially given the difficult terrain and recurrent nature of these events. Such disruptions can leave entire communities without water for extended periods.

Despite these risks, there are numerous opportunities to build resilience and adapt to the changing climate. A central strategy involves improving water resource management through the construction of dams, water pans, and boreholes to ensure consistent water supply. Rehabilitation and protection of water intakes, particularly those vulnerable to flooding and landslides, are essential. Irrigation infrastructure also needs to be expanded to support agriculture in drought-prone areas, thereby reducing dependence on erratic rainfall.

Environmental conservation efforts present another key opportunity. The County Government, in collaboration with stakeholders, is promoting massive tree planting initiatives aimed at enhancing catchment stability, acting as carbon sinks, and reducing the risk of floods and landslides. Agroforestry and soil conservation practices are also being encouraged as part of broader ecosystem-based adaptation efforts.

In the agricultural sector, the promotion of drought-tolerant crops and improved farming techniques can help communities cope with unpredictable weather patterns. Training programs in climate-smart agriculture, including kitchen

gardening and small-scale irrigation, are particularly beneficial in vulnerable wards such as Ithanga and Kakuzi.

Further, renewable energy offers a promising avenue for resilience building. The county is increasingly focusing on solarizing community water projects and promoting clean energy sources, which reduce reliance on fossil fuels and improve the sustainability of essential services. There is also a growing emphasis on improving access to early warning systems and localized weather forecasts to enable communities to prepare for climate-related events.

At the institutional level, the County Government and Water Service Providers (WSPs) are adopting climate-resilient project designs and incorporating risk reduction strategies into their strategic plans. These include routine monitoring, performance tracking, and supportive partnerships that enhance service delivery.

Table 1.8 Climate change related risks and their economic impacts

Climate Risk	Likelihood	Economic Impact	Opportunities for Resilience
Drought	High	Very High	Investment in irrigation infrastructure, drought-tolerant crops, water conservation practices
Flooding	Medium	High	Improved flood management, flood-proofing water infrastructure, early warning systems
Landslides	Medium to High	Very High	Catchment management, relocation of infrastructure, climate-resilient urban planning
Extreme Weather Events	Medium	High	Resilient water infrastructure, climate-smart agriculture, diversified water sources
Reduced Water Availability	High	Very High	Alternative water sources, sustainable water management, groundwater exploration

1.2.6 Assessment of Gender specific and climate induced vulnerabilities

Climate change in Murang'a County intensifies existing gender inequalities, especially in relation to water and sanitation service provision. While both women and men are affected by climate-related events such as floods, landslides, and droughts, they experience these impacts differently due to distinct societal roles and responsibilities.

When extreme weather events strike such as landslides or floods the entire communities can be displaced, and water infrastructure often becomes damaged or inaccessible. In such situations, women and children are typically the most vulnerable. Women are usually expected to ensure the continuity of domestic routines, such as preparing meals, fetching water, and caring for

children, even when resources are scarce or disrupted. With schools damaged or closed, women also face the additional burden of ensuring that children return to learning as soon as possible, despite adverse conditions.

Men, on the other hand, are generally expected to respond to the financial pressures that emerge during and after such disasters. When water supply systems fail, water vendors often sell water at exorbitant prices. The responsibility for meeting these new and unexpected household expenses frequently falls on men. In cases where homes are destroyed by floods or landslides, men are also typically expected to take the lead in rebuilding and ensuring structural recovery for their families.

These gendered expectations reinforce traditional roles and amplify stress for both men and women. Women's time burden increases significantly due to longer distances travelled for water collection and the need to manage household welfare with reduced resources. Men face economic pressures that strain household incomes, especially in low-income or rural areas where alternative livelihoods are limited.

Moreover, the impacts of climate change on water and sanitation exacerbate broader gender disparities in decision-making and access to resources. Women's limited influence in community or household decisions means that their specific needs such as access to clean water, menstrual hygiene, and safe sanitation may be overlooked in the design of response or adaptation measures. This undermines the overall effectiveness of climate adaptation strategies.

Climate-related disasters also highlight gender-specific vulnerabilities. Social norms and caregiving responsibilities may restrict women's mobility, making it more difficult for them to evacuate or access emergency relief. In contrast, men are expected to be the first responders, rebuild infrastructure, and financially sustain the household during recovery.

Recognizing these differences is essential for designing inclusive and effective climate resilience programs. Climate interventions in Murang'a County must incorporate gender perspectives to address both women's and men's unique challenges and contributions. This includes ensuring women's voices are included in planning and decision-making processes, supporting women's economic empowerment, and promoting equitable access to water, sanitation, and hygiene (WASH) services.

Addressing these gendered impacts not only supports vulnerable groups but strengthens the resilience of the entire community in the face of climate variability.

1.2.7 Sector-specific adaptation and mitigation measures to enhance water security

Table 1.9 Sector specific adaptation/mitigation measures

Measure	Type	Priority	Cost-Benefit Analysis	Justification
Construction and Rehabilitation of Dams, Water Pans, and Boreholes	Adaptation	High	High initial cost but ensures long-term water supply sustainability, especially during drought periods.	Ensures consistent water availability, supporting agriculture and domestic use.
Expansion of Small-Scale Irrigation Systems	Adaptation	High	High upfront cost but ensures consistent agricultural output, reducing economic losses from unreliable rainfall.	Supports agriculture, reducing dependence on erratic rainfall, and improving food security.
Promotion of Drought- Resistant Crops and Agroforestry	Adaptation	Medium	Low to medium cost, with long-term benefits in reducing water demand, enhancing soil fertility, and improving food security.	Enhances resilience to drought, reduces water demand, and improves agricultural productivity.
Improved Flood Management Infrastructure	Adaptation	Medium	High cost but significantly reduces flood damage to crops, homes, and infrastructure.	Protects livelihoods by mitigating flood risks and preserving water infrastructure.
Catchment Management and Ecosystem Conservation	Adaptation	Medium	Moderate costs for planting and maintenance, with long-term benefits in improving water quality and reducing landslide risks.	Enhances groundwater recharge, reduces erosion, and mitigates flood risks.
Strengthening Water Pipes and Intakes Against Flooding and Landslides	Adaptation	High	High costs for repair and relocation but ensures continued water supply during extreme weather events.	Protects water infrastructure from damage, ensuring reliable water supply.

Development and Dissemination of Early Warning Systems	Adaptation	Medium	Low to medium cost, with high benefits in preparedness and response to climate events.	Enables better planning and disaster response, reducing the economic and social impacts of climate hazards.
Solarization of Community Water Supply Systems	Mitigation	High	High initial investment but long-term savings in operational costs, improving reliability and sustainability.	Reduces reliance on fossil fuels, ensuring more sustainable water service delivery.
Water Conservation Campaigns and Efficient Technologies	Mitigation	Medium	Low cost with high benefits in terms of reducing water demand and lowering operational costs for water utilities.	Improves water efficiency and reduces demand on freshwater resources.
Leak Detection and Repair in Water Distribution Networks	Mitigation	High	Moderate cost for repairs but reduces water loss, improving availability and reducing operational costs.	Enhances efficiency in water distribution, ensuring more water is available for communities.
Afforestation and Reforestation Projects	Mitigation	Medium	Moderate cost with long-term benefits for water catchment areas and ecosystem stability.	Improves groundwater recharge, reduces flood risk, and contributes to carbon sequestration.
Wastewater Treatment and Reuse for Irrigation	Mitigation	Medium	High initial cost but provides alternative water sources for agriculture, reducing pressure on freshwater.	Provides alternative water sources for irrigation, supporting agricultural sustainability.

1.2.8 Existing programs supporting water driven economic development

There exist several programs that support water driven economic development in Murang'a. They include smart city program that seeks to make urban centres clean and accessible. Residents can access water points from a clean hygienic environment.

Uji program is a flagship project of the county government of Murang'a. In the program, early childhood learners are provided with meals every day. Water infrastructure is installed closer to

the EDE centers to facilitate operation of this programme. Classrooms for the early learners are also constructed and old ones rehabilitated. The construction work requires much water from the county water and sanitation providers.

1.2.9 Overview of the ongoing and Planned Climate resilient interventions

Tree planting has been an ongoing intervention in several departments including Kenya Forest Service, Department of environment and climate change, Ffloods program has also been spearheading this activity where both fruit and indigenous trees are planted and survival rates monitored. These programs are planned for implementation in the coming financial years. Climate smart water infrastructure designs have been going on and the same is planned for the future.

1.2.10 Potential projects and partnerships to strengthen the water economy nexus.

The county government of Murang'a has lined up projects for implementation to spur and strengthen the water economy. They range from the following:-

- I. Drilling and equipping of new borehole to access more households with domestic water
- ii. Rehabilitation of old but productive boreholes
- iii Increase water storage by construction of water tanks
- iv. Development of water conveyance pipelines to access rural areas with treated water.
- v. The county is partnering with the private sector such as East Africa Breweries, Water Fund, Water sector trust fund in order to accelerate water service provision..

CHAPTER TWO

2 WATER, SANTATION and HYGIENE SERVICES COVERAGE STATUS

2.1 County Water Resources Endowment

Murang'a County is endowed with both surface and ground water resources. Below is the analysis of these resources.

2.1.1 Surface Water Resources Assessment

Murang'a County is drained by four major perennial rivers namely Mathioya River, Maragua River, Sabasaba River and Thika River, and their respective tributaries. The rivers have their headwaters originating from the Eastern slopes of the Aberdares. Several River Gauge Stations (RGS) have been erected to gauge the flow of these surface water resources.

The figure below shows the locations of these River Gauging Stations.

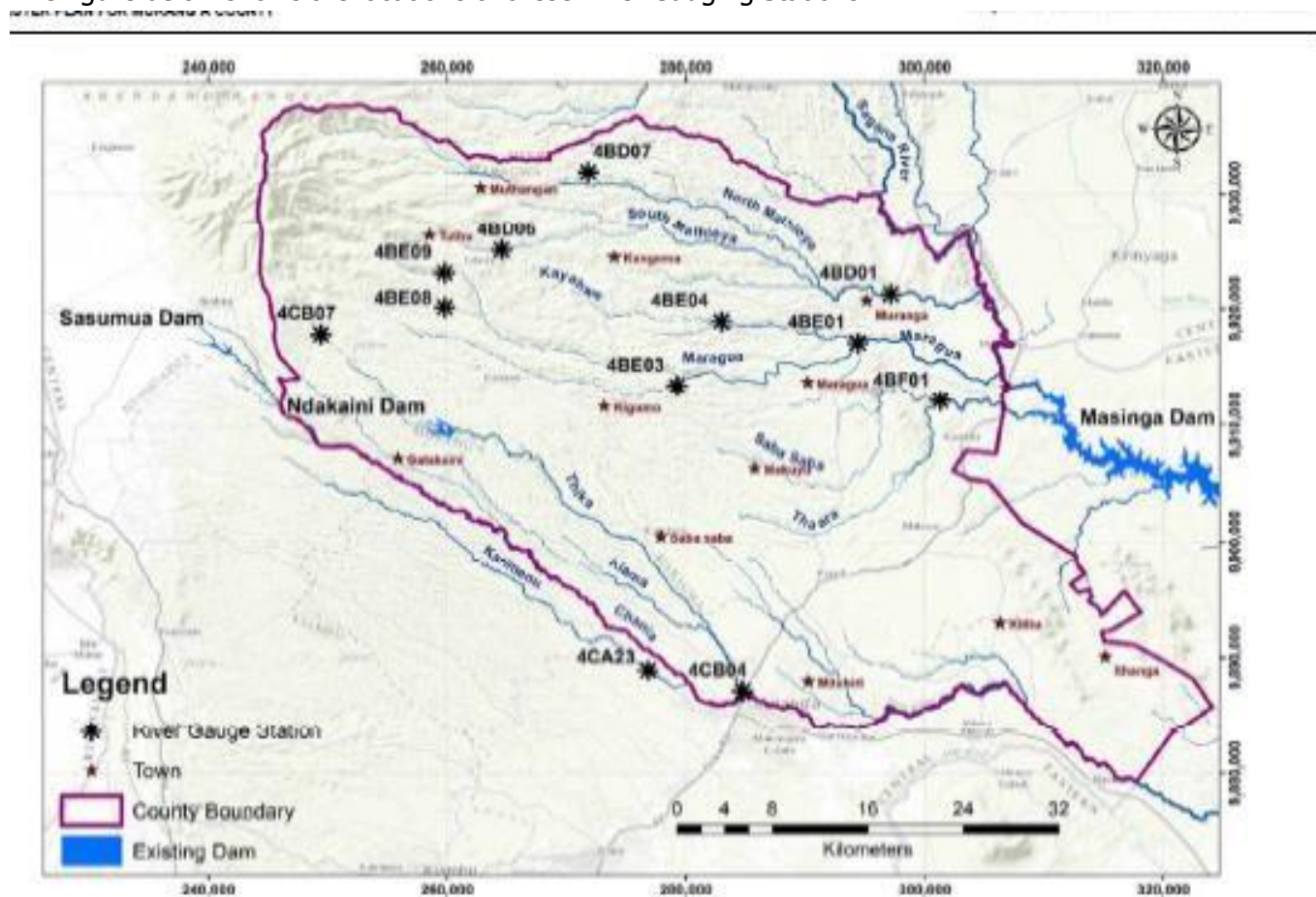


Figure 1.4: Location of River Gauging Stations (RGS) in Murang'a catchment areas

a) Hydrology of Mathioya catchment

Table 2.0. Mathioya River flow statistics from simulated discharges under existing conditions

Mathioya RGS	(m ³ /sec)		
	Flood flow (Q 50)	Normal flow (Q 80)	Base flow (Q 95)
4BDO6	1.5	1.1	0.9
4BDO7	3.6	2.5	2.0
4BD01	4.6	1.5	0.1

Q50 =Flood flow, Q80 = Normal flow , Q95= Reserve flow(Base flow)

Where:

- 2.1.1.1 Q50 is the flood flow which can be abstracted for both irrigation, Industrial and domestic use
- 2.1.1.2 Q80 is the normal flow where abstractions can only be done for Domestic and industrial use
- 2.1.1.3 Q95 being the reserve /environmental flow which cannot be abstracted. It is reserved for the flora and the fauna living in and around the river

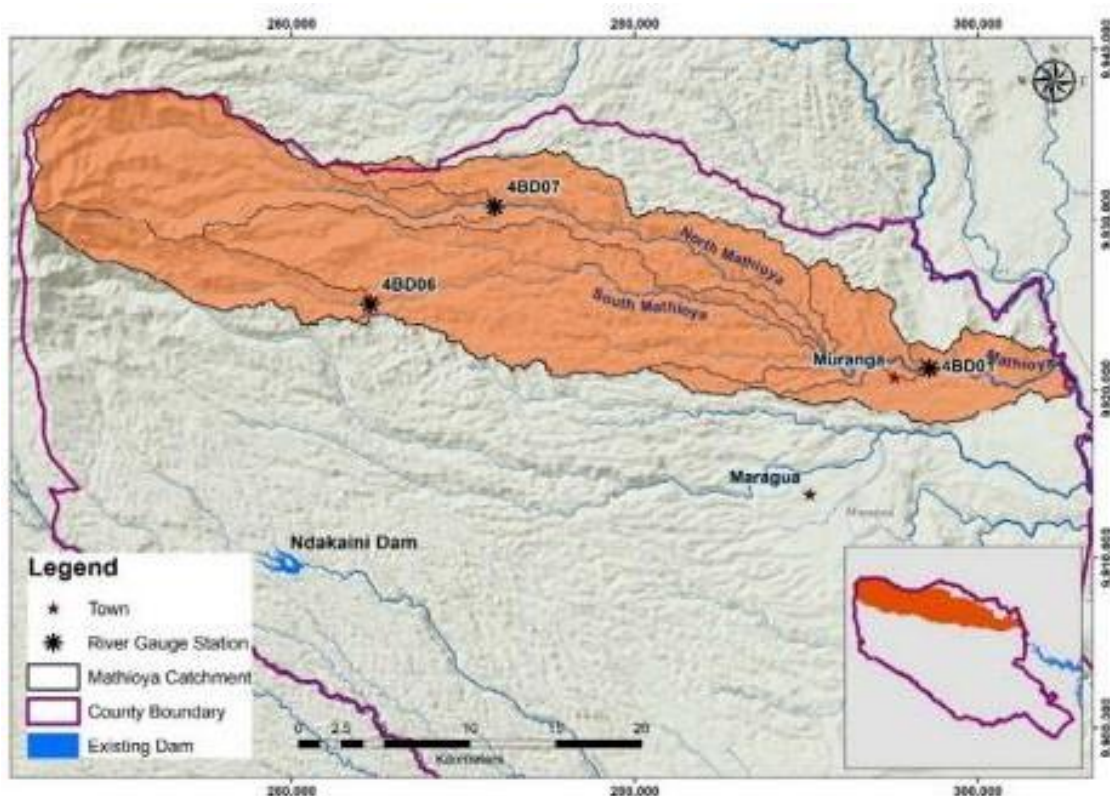


Figure 1.5 Location of Mathioya River catchment

According to simulations for Mathioya catchment, all existing abstraction requirements are currently being met, except for Hydro Electric Power requirement, whose time-based reliability of supply is 93% for the inter-basin transfer to Wanjii Power Station. The available water for use after meeting all existing abstractions is given in Table 2.2 below.

Table 2.1; Water potential for development- Mathioya catchment

Mathioya RGS	m³/sec						m³/day	
	Q50	Q80	Q95 Simulated	Q95 Neutralized	Q50-Q80	Q80-Q95	Q50-Q95	Q80-Q95
4BD O6	1.5	1.1	0.8	0.9	0.4	0.2	34,560	17,280
4BD O7	3.6	2.5	1.9	2.2	1.1	0.3	95,040	25,920
4BD 01	4.6	1.5	0.1	5.5	2.9	1.4	250,560	-

Where:

- 2.1.1.4 Q50 is the flood flow which can be abstracted for both irrigation, Industrial and domestic use
- 2.1.1.5 Q80 is the normal flow where abstractions can only be done for Domestic and industrial use
- 2.1.1.6 Q95 being the reserve /environmental flow which cannot be abstracted. It is reserved for the flora and the fauna living in and around the river

A comparison between the naturalized and simulated Q95 flows shows that the requirement by WRA to ensure the naturalized Q95 flows downstream is not being met. The inter basin transfer to Wanjii Power Station, immediately upstream of the RGS 4BD01 is 4.86m³/s which is 89% of the naturalized Q95 (5.47 m³/s). Therefore, the simulation shows that the Mathioya River Catchment is at optimum abstraction in terms of the magnitude of direct run off river abstractions.

b) Hydrology of Maragua Catchment

Irati River is one of the water resources in Maragua catchment. Table 2.3 below shows the Irati River flow at RGS 4BE 08 and is fully at optimum abstraction. Similarly, further abstractions on Maragua River at RGS 4BE 09 is not recommended. Towards the catchment outlet (RGS 4BE 01), the potential for water resource development is large. Therefore, in this view, the upper catchments of Maragua River are already exploited in terms of the extent of direct run off river abstractions. The potential for further abstraction is towards the catchment outlet. Storage options should be investigated for any future development of the water resource of Maragua River Catchment. A proposal for development of Irati 3 and Maragua 4 dams has already been made. Maragua B dam has already been constructed and is supplying water to Maragua town and its environs from Gakoigo Treatment works.

Table 2.2; Maragua River flow statistics from simulated discharges under existing conditions

Maragua RGS	m³/sec		
	Q 50	Q80	Q95
4BE O8	0.35	0.22	0.15
4BE 09	1.28	0.90	0.72
4BE 01	5.15	4.46	3.32

Where:

- 2.1.1.7 Q50 is the flood flow which can be abstracted for both irrigation, Industrial and domestic use
- 2.1.1.8 Q80 is the normal flow where abstractions can only be done for Domestic and industrial use
- 2.1.1.9 Q95 being the reserve /environmental flow which cannot be abstracted. It is reserved for the flora and the fauna living in and around the river

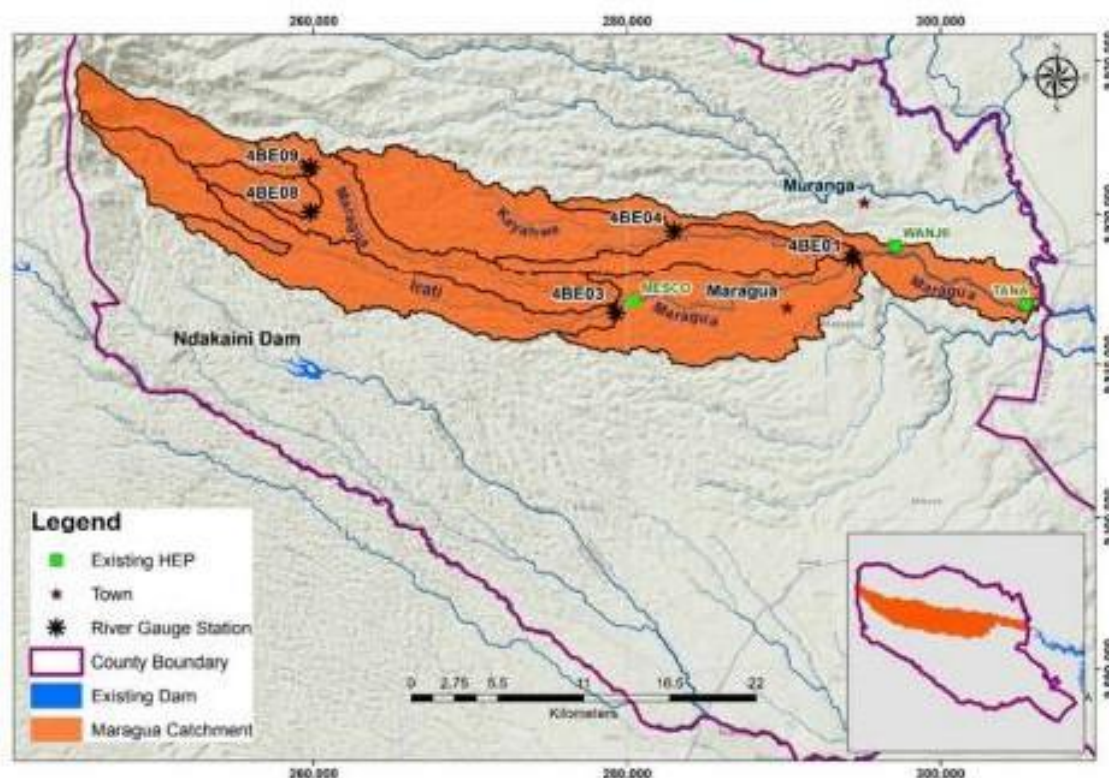


Figure 1.6 : Location of Maragua River Catchment

Spatiotemporal information of all abstractions is critical to assign the demands along the river coupled with their actual magnitudes. Monitoring of the river flows is absolutely necessary to understand the impacts of the existing abstractions and for guidance to any future water resources development in the catchment. The water potential for development along Maragua catchment is given in the table below.

Table 2.3; Water potential for development-Maragua Catchment

Maragua RGS	m ³ /sec					m ³ /day	
	Q50	Q80	Q95	Q50-Q80	Q80-Q95	Q50-Q95	Q80-Q95
4BE08	0.21	0.18	0.15	0.03	0.03	2,590	2,590
4BE09	0.98	0.9	0.72	0.08	0.18	6,900	15,550
4BE01	44.86	4.435	3.32	0.43	1.11	37,150	95,904

c) Hydrology of Sabasaba Catchment

The Sabasaba Catchment was set up using RGS 4BF01 located downstream of the confluence of Sabasaba and Thaara Rivers. An additional station 4BF02, located very close downstream of 4BF01, having recent data was used as well. Due to the similarity in catchment characteristics, some model parameters were used for both sub-catchments to complete the model for the entire catchment. Development of an integrated water and irrigation master plan for Murang'a county final master plan report chapter: The NRMSE for calibration and validation was 7% and 11% respectively. These results were deemed to be acceptable considering the quality of observed data. A summary of the flow statistics under natural conditions is given in Table 5 below.

Table 2.4; Flow Statistics for Simulated Discharges under Natural Conditions

SabaSaba RGS	m ³ /s		
	Q50	Q85	Q95
4BF02	0.8	0.4	0.2

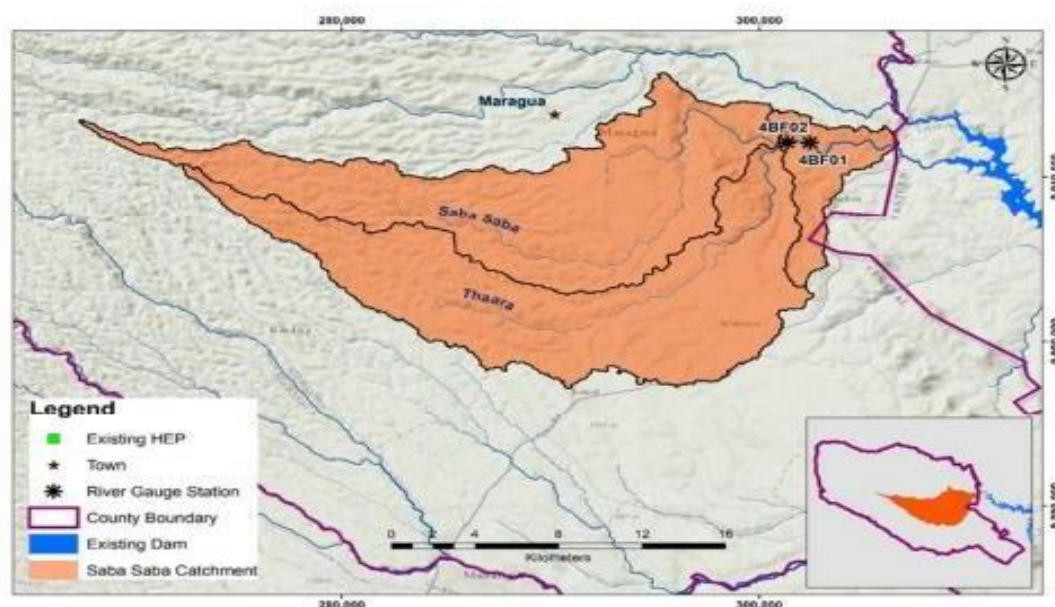


Figure 1.7 : Location of Sabasaba River Catchment

Table 6 below gives a summary of flow statistics under existing conditions for RGS 4BF02, considering existing abstractions as per abstraction data obtained from Water Resources Authority for the Sabasaba Catchment.

Table 2.5; Flow Statistics for Simulated Discharges under existing conditions (m³ /s)

SabaSaba RGS	m ³ /s		
	Q50	Q85	Q95
4BF02	1.3	0.6	0.2

Development of storage to capture flood flows for later use should be implemented.

Table 2.6; Water potential for development

	m³/sec					m³/day	
SabaSaba RGS	Q50	Q80	Q95	Q50-Q80	Q80-Q95	Q50-Q95	Q80-Q95
4BF02	1.3	0.6	0.2	07	0.4	60,480	35,560

The developed rainfall runoff model is reasonably accurate in infilling and extending the flow time series. However, uncertainty within the input data, model structure and parameterization can influence the results. Nonetheless, the NRMSE values for the simulation was 7% and 11% for calibration and validation sets which is considered reasonably good.

The WRA abstraction records show 32,400 m³ /day from the flood flow has already been allocated. Therefore, flood flows available for use is 28,080 m³ /day. Development of storage to capture flood flows for later use should be implemented.

c) Hydrology of Thika Catchment

Model Simulation Observed streamflow data for the Thika River Catchment was obtained for RGSs; CB07, CA23 and 4CA04. The Data for 4CB07 and 4CA23 was of poor quality and hence not useful in the simulation. The key station, 4CB04 did not have any data post 1968. Due to the extensive water resource developments in the upper reaches of the Thika Catchment, a different approach had to be adopted to simulate the flows at 4CB04, which entailed simulation of the discharge time series for this gauge to the year 2001 by regression with RGS 4CB07. Thereafter, a model was set up to simulate the intermediate catchment between Ndaka-ini Dam and RGS 4CB04, with the initial model parameters transferred from the neighboring Sabasaba Catchment.

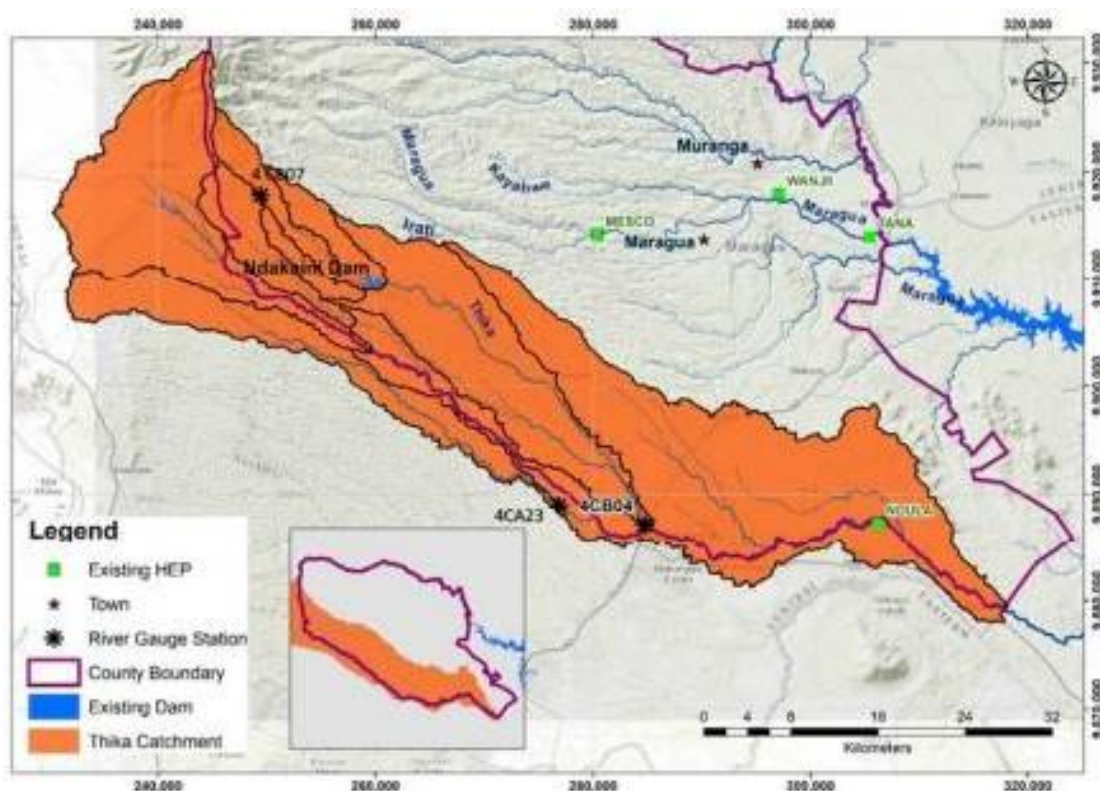


Figure 1.8: Location of Thika River Catchment

Under the Feasibility Study and Master Plan for Developing New Water Sources for Nairobi and Satellite Towns (Egis BCEOM/ Mangat I.B Patel, 2012), the Consultant developed a model for simulating the existing Thika – Chania System supplying water to Nairobi City. Stream flow time series for Kiama, Kimakia, Chania at the abstraction locations and inflows to Ndaka-ini (Thika) Dam were prepared for use in their model. The same time series and model setup was used in this Study and the downstream catchment added to simulate the flows at RGS 4CB04. The model was set up for the period 1981 – 1991 to simulate the natural conditions. The Ndaka-ini Dam inflow time series for this period was directly specified in the model. The difference between the flows at RGS 4CB04 and inflow to the Dam was then calculated, which is the contribution of the intermediate catchment between them. A rainfall runoff model was developed for the intermediate catchment.

Table 2.7; Flow Statistics for Simulated Discharges under Natural Conditions (m³ /s)

Thika RGS	Observed (m ³ /sec)			Simulated m ³ /sec		
	Q50	Q80	Q95	Q50	Q80	Q95
4C B04	3.87	2.28	1.41	3.94	2.15	1.45

Simulation of the natural conditions up to year 2010 was not possible because of Ndakaini Dam coming online in Year 1994 which will have changed the downstream flow regime. The dam inflow time series used in the model would reflect this. An attempt to rearrange the abstraction data according to the smaller streams and tributaries of the Thika River proved to be difficult. Very few of the names of rivers and tributaries given in the WRA data could be located on the 1:50,000 topographical maps. Therefore, the abstractions were summed

according to the WRA basins and categorised as upstream/ downstream of the Ndaka-ini Dam. The flow statistics of simulated discharge at 4CB04 under existing conditions

Table 2.8; Flow Statistics for Simulated Discharges under Existing Conditions (m³ /s)

Thika RGS	Simulated (m ³ /sec)			Normal flow m ³ /day	Flood flow M ³ /day
	Q50	Q80	Q95	Q80-Q95	Q50-Q80
4C B04	3.08	1.89	1.51	32,832	102,816

From Table 9 above, the Flood Flow under existing conditions is 102,816 m³ /d. However, 62,159 m³ /d flood flow is abstracted by Ndaka-ini Dam. Therefore, the available Flood Flow volume is 40,654 m³ /d. ii) Surface Water Potential The surface water potential of Thika Catchment at RGS 4CB04 is 32,832 m³ /day and 40,654 m³ /day from normal and flood volumes.

The Thika catchment has been extensively modified in its upper reaches by Ndaka-ini Dam and inter-basin transfer to Chania for supply to Nairobi City. Coupled with lack of observed discharge data, an estimate of the water resources at the outlet of Thika catchment was made with reasonable success. The available flow for abstraction from the catchment at RGS 4CB04 is 32,832 m³ /day. This flow can be used for domestic water supply. However, for development of irrigation schemes, the available flood discharge would have to be used i.e. 40,654 m³ /day. It is recommended to develop storage within the catchment to capture flood flows to ensure higher reliabilities of supply.

e) Surface Water Quality Surface

Results from previous Water quality analysis for samples taken from various sites indicate high turbidity levels, above the set Kenya Standard and WHO Standard limit of 5 NTU for treated drinking water quality. This could be attributed to the samples having been taken during the rainy season. Similarly, the true colour of the water in the river resources was also higher than the standard limit of 15HU for drinking water. This could also be as a result of high amount of the Total Suspended Solids. The implication is that costs of water treatment will be high. This calls for improved catchment protection and management.

From the test results carried out for previous samples, pesticide levels in surface water are within the set standard levels, on this basis, water from sampled source is suitable for Potable use. Tests on Irrigation water quality indicated that generally, water from the sampled areas is suitable for Irrigation use.

2.1.2 Surface Water Resources

2.1.3 Analysis of Rainfall Spatial Distribution and Monthly Statistics in Murang'a County

Rainfall patterns in Murang'a County are highly variable due to topography, altitude, and climate change influences. Below is a detailed spatial and temporal analysis based on recent meteorological data (2013–2023).

1. Spatial Distribution of Rainfall

Murang'a's rainfall is orographic (mountain-influenced), with significant variation between highlands and lowlands:

Table 2.9 ; Rainfal zones

Zone	Annual Rainfall (mm)	Key Characteristics
Highland (East)	1400-1800	Abardare ranges –(Kangema, Matioy). Highest rainfall, bimodal pattern
Midlands (Central)	1000-1400	Murang'a Town, Kiharu-Moderate Rainfall , reliable long rains.
Lowlands (West)	800-1,000	Kandra, Maragua,-Driest zone , frequesnt dry spells

Key observations;-Rainfall decreases from the East (Aberdare foothills) to the West Kandara plains. **(Source;** Kenya Meteorological Department, 2023; ICPAC Climate Atlas)

2. Monthly Rainfall Statistics (1991–2020 Averages)

Murang'a has a bimodal rainfall pattern (two rainy seasons):

Table 3.0 Monthly Averages (mm)

Month	Highlands	Midlands	Lowlands
January	60	50	40
February	70	55	45
March	130	110	90
April	220	180	150
May	180	160	120
June	50	40	30

July	30	25	20
August	40	30	25
September	80	70	50
October	150	130	100
November	170	140	110
December	90	75	60

Key Observations:

- Long Rains (March–May): Contribute 45% of annual rainfall (peak in April).
- Short Rains (October–December): Provide 35% (peak in November).
- Dry Spells: June–September and January–February are driest (critical for irrigation planning).

(Source: KNBS Statistical Abstract 2022, CHIRPS Satellite Data)

3. Recent Trends (2013–2023)

a. Declining Rainfall

- Long rains have decreased by 15% since 2013, with more erratic onset dates.
- Short rains are becoming more intense but shorter (higher flood risks in Nov/Dec).

b. Spatial Shifts

- Kandara has seen a 20% reduction in annual rainfall vs. 10% in Kangema.
- Murang'a Town reports more unseasonal showers, disrupting farming calendars.

(Source: ICPAC Climate Bulletin, 2023)

4. Impacts of Rainfall Variability

a. Agriculture

- Tea/Coffee Zones (Highlands): Rely on consistent rains; yield losses during dry spells.
- Maize/Beans (Lowlands): Frequent crop failures in Kandara due to late rains.

b. Water Access

- Springs/Dams in highlands (e.g., Mathioya) recharge faster than lowland boreholes.
- Women spend 2–3 extra hours/day fetching water during dry months.

c. Flood Risks

- Maragua River Basin faces flash floods in April/November,

contaminating water sources.

5.0 Climate Adaptation measures put in place ;-

These include;-

i. Rainwater Harvesting

- Targeting lowlands (Kandara) with community storage tanks.

ii. Early Warning Systems:

- Dissemination of monthly forecasts via SMS (especially for women farmers).

iii. Crop Diversification

- Promotion of drought-resistant crops (e.g., sorghum) in dry zones.

Murang'a's rainfall is spatially uneven and temporally unpredictable, requiring localized adaptation strategies. Highlands receive reliable rains, while lowlands face increasing aridity, exacerbating gender and economic disparities in water access.

2.1.3 Ground Water Resources Assessment

a) Physiography

The physiographic setting of Murang'a County is complex due to ruggedness of the land mass, resulting from the hilly nature and the many rivers that traverse the County. In addition, geology plays a major role in influencing the terrain. The high-altitude areas (2400masl) are at the foot of the Aberdare Ranges. The land falls rapidly to the East, punctuated by numerous hills and very deep valleys that are steep sided and in some cases with streams and rivers. At an altitude of about 1500m, the land evens out and the only visible prominent physical features are the hills. At an altitude of about 1100m, the land rolls out into dry plains.

The elevated hinterland of the volcanic region is drained and eroded by a series of easterly-flowing rivers, which have developed gorge-like valleys with numerous waterfalls, cascades and rapids. Indeed, the County is well drained by several rivers, the major ones being North and South Mathioya, Maragua, Irati, Saba Saba, Kabuku, Makindi, Thugi, Thamuru and Thika rivers. All the rivers flow from the Aberdare ranges to the West, SouthEast-ward to join Tana River.

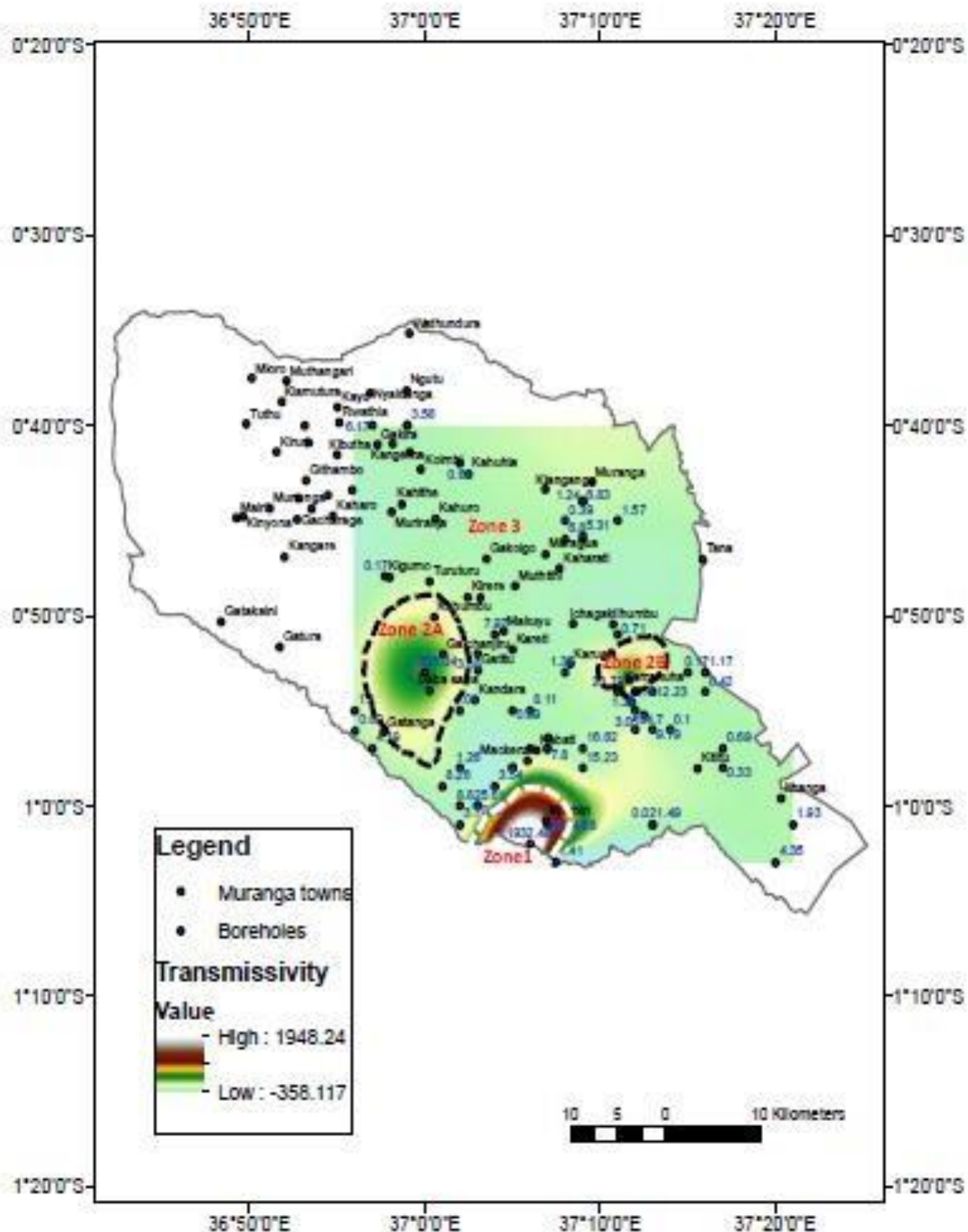


Figure 1.9 : Groundwater Potential Zones of Murang'a County

b) **Geology**

On a regional scale, the study area is situated towards the Eastern boundary of an extensive volcanic sheet, which stretches from the Eastern shoulder of the Rift Valley to the Murang'a area. The geology consists of volcanic formations, underlain at depth by metamorphic Basement rocks. Notably, one borehole (C3034) located at Murang'a Town encountered Basement at a depth of 124m bgl. The basement rocks comprise of metamorphic rocks of

sedimentary origin and intrusive bodies of basic igneous rocks such as biotite gneisses (e.g. Kiambicho Hills), granitoid gneisses (e.g. Kiangure Hill), meta-dolerites (Muthuru). The Kapiti phonolites directly overlie the Sub-Miocene Basement topography. In the Kamahuha area, one borehole (located at Gakira) encountered intercalated fresh phonolites at a depth of 98m bgl. Simbara basalts and agglomerates overlie the Kapiti Phonolites at Maragua and Makuyu valleys.

The formation is known to be of variable thickness in the area. Previous drilling reportedly encountered the basalts at depths ranging from 35 - 80m bgl. In the Gathama valley, their maximum vertical extent is expected be only 30 metres. The upper trachytic tuff is the youngest pyroclastic bed and forms the surface of the ridges, where it has largely been weathered and eroded to buff yellow to brick red soils.

Two main faults were noted in Murang'a County running in NW-SW direction; one fault near the foot of Aberdare ranges and the second one located to the South of the Murang'a Town, extending into the basement formations. In addition, the orientation of the basement formation boundaries in NW-SE direction connote to presence of faults, fracture zone or unconformities, which are features that enhance presence and transmission of ground water.

2.1.3.1 Analysis of Ground Water sources:-

Map 26 shows distribution of the various classes of boreholes within the County. It is noted that the areas with high population and water demand have higher number of boreholes such as Kenol, Kabati, Maragua and Murang'a town. The urban areas have portable water distribution systems which ensure that the overreliance on boreholes is reduced

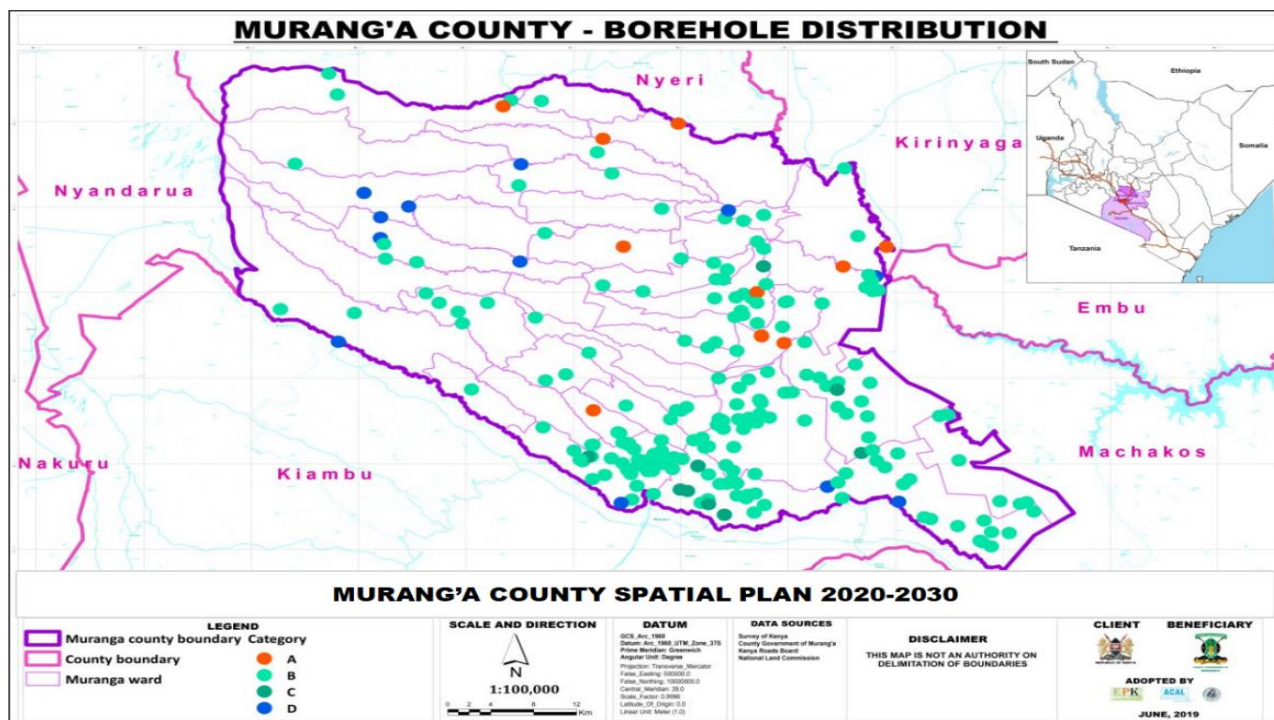


Figure 2.0 –Boreholes distribution in Murang'a county

There's a structured overview of aquifer yield, size, and water quality in Murang'a County,

based on available hydrogeological data. While I can't generate an actual map, I'll provide key details that can guide spatial analysis or be used to create one.

1. Major Aquifers in Murang'a County
Murang'a's aquifers are primarily shallow, weathered basement aquifers (common in Kenya's highlands) and fractured volcanic aquifers. Key aquifer zones are illustrated by the table below:-

Table 3.1 ; Major Aquifers

Aquifer zone	Yield (m ³ /day)	Size (approx. area)	Water quality	Key Challenges
Kandara –Maragua Boreholes	50-100	120 km ²	Moderate , high floride	Over-abstraction for Irrigation
Murang'a town	30-80	60 km ²	Good –Low contamination	Urban Pollution
Gatanga -Kiharu	20-60	90 km ²	Poor, (High and Iron salinity)	Low recharge due to deforestation
Kangema-Mathioya	40-120	150 Km ²	Fair, (Moderate nitrate levels)	Competing coffee /tea farm use

(Sources: WRA Murang'a Basin Report 2022, Kenya Water Institute)

2. Aquifer Yield and Recharge Rates

-High-Yield Zones

- Mathioya River Basin (yields up to 120 m³/day) due to fractured volcanic rocks.
- Maragua Valley (reliably recharged by seasonal rivers).

- Low-YieldZones:

- Dry uplands (e.g., parts of Kigumo) with yields less than 20 m³/day—dependent on rainwater.

Recharge Rates

Average 3–5% of annual rainfall infiltrates aquifers (higher near forests, lower in farmlands). Deforestation has reduced recharge by approximately 15% since 2010 (JICA Hydrogeological Study, 2021).

3. Water Quality Hotspots

Table 3.2 Water Quality Hotspots

Parameter	Problem areas	Health /Social Equity Impact
Floride	Kandara, Gatanga(>1.5 mg/l)	Dental /skeletal fluorosis-(Women and children worst affected)
Nitrates	Kangema (From fertilizer runoff)	Blue baby syndrome;(limits use for infants)
Iron	Kiharu (Reddish water)	Corrodes pipes; rejected by households
E-Coli	Informal settlements near Murang'a Town	Diarrheal diseases (high burden on women caregivers)

- (Source: Murang'a County Public Health Lab, 2023)

4. Equity Implications of Aquifer Access

Gender Disparities

-Boreholes (dependent on aquifers) are male-managed (70% of committees), while women rely on distant springs.

- Fluoride-rich zones disproportionately affect women/children (more home water use).

- Climate Vulnerability

- Low-yield aquifers in Kigumo dry up fastest during droughts, forcing women to walk further.

5. Areas for borehole development area;-

- High-Yield Zones: Expand rainwater harvesting in low-recharge areas.
- Water Quality Mitigation-: Installation of community defluoridation plants in Kandara/Gatanga.

6. Equitable Governance: Inclusion of women in groundwater monitoring programs.

2.1.4 Hydrogeology

The hydrogeological conditions and aquifer characteristics of Murang'a County were evaluated through use of transmissivity values from several boreholes considered to be rather moderate to high. The mean depth of the existing 140 boreholes is 111.6m bgl, with a mean water strike depth of 76.6m bgl, the average yield amounts to 6.97 m³/hr, with a range of 0.06 to 27.3 m³/hr. The Ground Water Modelling Analysis indicate that 5,000 m³/day can be safely abstracted from a properly designed wellfield within the high ground water potential zone at Mitubiri area in Makuyu.

2.1.5 Water Resources Shared Between Counties

Murang'a County supplies water for domestic purposes to Nairobi County. Ndakaini Dam which is located in Gatanag sub-county and The Northern Collector Water Tunnel are the sources of this water. It is estimated that over 80 percent of water for Nairobi county comes from these two sources. Raw Water from Ndakaini dam is treated at Ng'ethu treatment works in Kiambu county and then conveyed to Nairobi city county through large diameter pipelines.. On the hand water from the Northern connector tunnel is treated at Kigoro treatment works in Gatanga sub-county which is located in Murang'a County.

- **Rivers**

Tana River, Garissa and Kitui counties also benefit from Murang'a County. Rivers whose sources are the Abaradare forest in Murang'a converge in Kambiti and form the giant Tana River which meanders through Kitui, Garissa and Tana River counties before emptying its water into the Indian Ocean at Kipini in Tana River County. These rivers forming the Tana are Mathioya, Maragua and Irati River are located in Murang'a county.

2.1.6 Water Resources Challenges

Pollution occurs during long rains experienced between March and May every year. Due to human activities such as cultivation along riverline Areas, soil and debris from farms are washed away into water sources by floods. Pollution increases turbidity in river sources and thereby increases the cost of water treatment.

2.1.9 Seasonal variations and climate related vulnerabilities affecting water supply

Murang'a County experiences significant seasonal fluctuations in water availability, which are primarily driven by variations in rainfall patterns, temperature shifts, and other climate-related factors. These seasonal changes have a profound impact on water service delivery across the region, affecting both the quantity and quality of available water. The key seasonal fluctuations and their consequences for service provision are outlined below:

➤ Rainy Season (March to May)

During the rainy season, water sources such as rivers, water pans, and reservoirs generally experience an increase in water levels. However, the intensity and distribution of rainfall can vary, leading to both positive and negative impacts.

Increased rainfall improves the flow of rivers and replenishes groundwater levels, ensuring a more stable water supply for the county. This period generally sees improved water availability, which helps reduce water rationing.

Heavy rains during this season can also lead to flooding, particularly in lower-lying areas like Maragua and Kiharu. Flooding can damage water infrastructure, submerge water intakes, and increase the risk of water contamination, which makes treatment more costly and challenging. Water service providers may face difficulties in maintaining clean and safe water delivery due to pollution and infrastructure damage.

➤ Dry Season (June to October)

The dry season in Murang'a, characterized by reduced rainfall and extended dry spells, exacerbates water scarcity. During this period, water levels in rivers and water pans drop significantly, and groundwater recharge slows down. As a result, water sources become less reliable, and water availability is severely constrained.

Water service providers struggle to meet the demand, leading to frequent rationing of water. Some communities may experience extended periods without water, while others may rely on expensive and distant water vendors to meet their needs. This not only increases costs but also raises concerns about the quality of water being provided. The dry season also affects agricultural activities, with crop irrigation and livestock water supply being compromised. This increases pressure on domestic water sources.

➤ Transition Periods (October to December)

As the county moves from the dry season into the short rains, the water availability typically

begins to improve. However, the transition from the dry period to the rainy season is often marked by erratic rainfall and unpredictable distribution, which can cause fluctuations in water levels.

While there may be an improvement in water availability, the transition phase can also bring challenges. The unpredictability of the rains can cause water sources to fluctuate rapidly, making it difficult for service providers to predict water supply and plan effectively. Additionally, flash floods can occur, which may wash away infrastructure, contaminate water sources, and disrupt water distribution systems.

Water service providers in Murang'a face a recurring challenge of maintaining consistent service delivery due to seasonal fluctuations. During both the dry and wet seasons, infrastructure such as pipelines, water intakes, and reservoirs can be damaged by extreme weather events like floods and landslides, which disrupt water supply.

The county's hilly terrain makes it especially prone to landslides during the rainy season, leading to the destruction of critical water supply infrastructure. This increases the cost of repairs and maintenance, further stretching the capacity of water service providers to maintain uninterrupted service.

Seasonal fluctuations often lead to higher operational costs for water service providers, as they must deal with infrastructure repairs, water treatment expenses due to contamination, and the challenge of meeting growing demand during periods of low availability. The cost of water delivery increases, which in turn may raise water tariffs for consumers, disproportionately affecting vulnerable communities

Table 3.3 Climate risks with impact tied to water source

Climate Risk	Impacted Water Source	Severity of Impact	Estimated Number of Affected Households	Key Indicators
Drought	Rivers, Pans, Boreholes	Severe reduction in water availability; depletion of rivers, water pans, and boreholes, leading to water rationing.	30-50% of households, especially in areas like Ithanga and Kakuzi.	Water scarcity, long distances to fetch water, decreased agricultural yields, increased water costs.
Flooding	Rivers, Intakes, Pipelines	Floodwaters submerge water intake points, damage water pipelines, and increase contamination of water sources.	20-40% of households in flood-prone areas like Maragua and Kiharu.	Contaminated water, infrastructure damage, increased treatment costs, interruptions in water supply.

Landslides	Pipelines, Water Intakes	Destruction of water pipelines and intakes, rendering them inaccessible. High repair costs and service interruptions.	10-20% of households in highland areas like Mathioya, Kangema, and Kigumo.	Infrastructure damage, long service interruptions, increased repair costs, community displacement.
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Erratic Rainfall (Prolonged Dry Spells)	Rivers, Groundwater	Decreased flow in rivers, reduced recharge of groundwater, leading to higher dependence on costly water sources.	15-30% of households, particularly in rural areas.	Increased reliance on distant water sources, high costs, reduced agricultural output, strain on domestic water.
Heavy Rainfall	Rivers, Reservoirs	Flash floods damage infrastructure, contaminate water sources, and increase sedimentation in reservoirs.	10-25% of households in affected areas (e.g., lower regions of the county).	Flood damage to infrastructure, increased water treatment costs, water contamination, infrastructure failure.

Table 3.4 Key threats to water quality and sustainability, including those linked to the impacts of climate change

Threat	Impact	Link to Climate Change
Flooding and Surface Runoff	Floods wash pollutants, sediments, and waste into rivers and water pans, causing contamination. Water treatment becomes more costly and complex.	Heavy rainfall and flash floods intensified by climate variability lead to increased contamination.
Landslides and Soil Erosion	Landslides in highland areas damage infrastructure and contribute to sedimentation in water sources, reducing water quality and storage capacity.	Saturated soils due to heavy rains trigger frequent landslides.
Reduced River Flows and Drying Sources	Prolonged droughts reduce base flows in rivers and streams, concentrating pollutants and reducing dilution capacity.	Erratic rainfall patterns and rising temperatures reduce surface water availability.
Siltation of Water Bodies	Deforestation, poor land use, and erosion cause silt to accumulate in dams and pans, reducing storage and water quality.	Intense rains cause soil erosion and sediment transport into water bodies.
Pollution from Agricultural Runoff	Excessive use of fertilizers and pesticides contaminates surface and groundwater, particularly during the rainy season.	Extreme weather increases surface runoff that carries agrochemicals into water sources.
Over-abstraction of Groundwater	Excessive pumping, especially during droughts, leads to aquifer depletion, saline intrusion, and lowered water tables.	Droughts reduce surface water availability, increasing reliance on groundwater.
Wastewater	Inadequate sanitation infrastructure	Increased floods overwhelm

Contamination	leads to direct discharge of untreated wastewater into the environment, especially during floods.	sanitation systems, leading to overflows into water sources.
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2.1.7 Potential climate change impacts on available water resources

➤ Reduced Surface Water Availability

Declining rainfall and prolonged dry spells reduce river flows, water pan levels, and dam storage, which limits the reliability of surface water for domestic, agricultural, and institutional use.

➤ Groundwater Depletion

As surface water sources become increasingly unreliable due to climate variability, reliance on groundwater intensifies. This heightened demand especially during prolonged droughts leads to over-abstraction, which lowers water tables and places aquifers at risk of degradation. The situation is particularly evident in drier areas such as Ithanga and Kakuzi, where communities increasingly depend on boreholes and shallow wells to meet their water needs.

➤ Increased Water Demand and Competition

Rising temperatures and unpredictable rainfall patterns are driving up water demand across agriculture, livestock, and domestic sectors. This increased demand intensifies competition over limited water resources, heightening the risk of conflicts particularly between upstream and downstream users. During droughts, the strain on livelihoods can lead to displacement and migration, further exacerbating social and resource tensions.

➤ Water Quality Degradation

Floods and intense rainfall events elevate surface runoff, transporting sediments, organic matter, and pollutants into water sources. During dry periods, reduced river flows concentrate these contaminants, further degrading water quality. In areas like Maragua and Kiharu, flooding has led to the contamination of intakes, significantly increasing the cost and complexity of water treatment.

➤ Damage to Water Infrastructure

Landslides and floods cause significant damage to water infrastructure, including pipelines, intakes, storage tanks, and distribution systems. These events often result in prolonged service disruptions and expensive repair efforts. For instance, the 2023 landslide in Kangema destroyed a major section of pipeline compromising service reliability.

➤ Threats to Ecosystems and Catchment Degradation

Climate variability, along with deforestation of the Aberdare Ranges, soil erosion, and habitat degradation, weakens the ability of ecosystems to naturally regulate and purify water. This results in a steady decline in both water quality and availability. Key consequences include

increased siltation in rivers and dams, and diminished base flows as seen in Maragua and Mathioya.

2.1.8 Climate Change vulnerability Assessment

2.1.8.1 Climate hazards affecting water and sanitation

In Murang'a County, climate hazards such as landslides, floods, and erratic rainfall pose significant threats to both water availability and sanitation systems, exacerbating the challenges faced by local communities. These climate risks have diverse and far-reaching consequences, particularly due to the county's varied topography and infrastructure vulnerabilities.

- **Mud and Landslides**

Landslides are among the most severe climate risks, especially in the county's hilly terrain. When heavy rainfall saturates the soil, the landmasses become unstable, increasing the likelihood of landslides that can displace crops, destroy homes, and disrupt water supply systems. The destruction can be devastating, as seen in the early 2025 landslide in Kangema, where several houses were buried, and six people tragically lost their lives.

This disaster wiped out livelihoods, with crops being washed away and homes destroyed. In other parts of the county, landslides have caused significant damage to infrastructure, including water pipelines and intakes, often making water access impossible for affected communities. The relocation of pipelines to more stable routes becomes an expensive and time-consuming solution. A notable example is the mid-April 2025 landslide in Kangema, which destroyed water pipelines worth thousands of shillings, cutting off water supply to parts of the community and requiring substantial resources for repair. With an estimated 90% of climate-related risks in Murang'a County being attributed to landslides, the damage to water infrastructure poses a critical threat to service delivery and sustainability.

- **Floods**

Flooding account for around 10% of climate-related risks in the county. The lower-lying areas, such as Maragua and Kiharu, are particularly vulnerable to flooding during heavy rains, which can wash away crops and damage water supply infrastructure. In some cases, floodwaters submerge water intakes and contaminate water sources, increasing the risk of waterborne diseases and driving up treatment costs.

The loss of crops due to flooding severely impacts livelihoods, especially in flood-prone regions where agriculture is the mainstay. Additionally, heavy rains increase the risk of dam embankment failures, leading to potential flooding downstream. Residents living in these vulnerable areas are regularly advised to relocate to higher ground to avoid further losses.

- **Erratic Rainfall Patterns**

Erratic rainfall patterns further complicate the situation, leading to inconsistent water availability across the county. Prolonged dry spells reduce river flows and groundwater recharge, leading to water scarcity in many areas. This forces communities to rely on distant and expensive water sources, exacerbating existing water access issues.

These climate hazards threaten the stability of water and sanitation systems in Murang'a County, requiring urgent attention to both short- and long-term adaptation measures. Improving the resilience of water infrastructure, implementing early warning systems, and promoting sustainable water management practices are critical to mitigating these risks and ensuring the county's water security.

Table 3.5 Climate risks and their impacts in Murang'a

Risk	Areas commonly occurring	Impacts	Impacts on waer supply and sanitation service delivery	Impacts in FY2022/2024	Mitigation measures proposed
Land and Mud slides	Upper areas of Murang'a- Mathioya, Kigumo, and Kangema sub-counties	Washes away livelihoods eg crops, houses and roads	Water pipelines are cuts off, households go without water	980 Households were cut off from water supply, Kshs 3 million lost in repair work, loss of revenue by water supply providers and other related expenses.	Upgrading of Tree planting and husbandry activities, using climate smart designs for water infrastructure where intakes are raised with reinforced concrete to avoid being submerged during heavy rains, introduction, and concrete anchor and thrust blocks along pipelines routes in vulnerable areas. Concrete piles to anchor pipelines
Floods	Lower areas of Muranga- Maragua Kiharu and Ithanga sub-counties	Washes away livelihoods eg crops, houses and cutes off roads, water infrastructute and	Water pipelines are cuts off, pollution of water sources increase, households	550 Households were cut off from water supply, Kshs 2.2 million lost in repair work, loss of revenue by	Upgrading of Tree planting and husbandry activities, using climate smart designs for water infrastructure where intakes are raised with

		increases pollution	go without water, cost of water treatment goes high	water supply providers, high cost of water treatment and other related expenses.	reinforced concrete to avoid being submerged during heavy rains, introduction, and concrete anchor and thrust blocks along pipelines routes in vulnerable areas. Concrete piles to anchor pipelines
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2.1.9 Characterization of climate change impact in the county

▪ Erratic Rainfall and Droughts

Murang'a faces unpredictable rainfall patterns, with prolonged dry spells followed by intense rainy periods. These fluctuations lead to water shortages, reduced groundwater recharge, and increased competition for water resources among domestic, agricultural, and livestock sectors. Such variability complicates water resource planning and management.

▪ Flooding and Soil Erosion

Heavy rains result in flooding, particularly in lower-lying areas like Maragua and Kiharu. Floodwaters submerge crops, damage water infrastructure, and increase water contamination risks. Soil erosion from floods leads to siltation of rivers and dams, degrading water quality and reducing storage capacity.

▪ Landslides

The hilly terrain of Murang'a is prone to landslides, especially during heavy rains. Landslides destroy homes, crops, and critical infrastructure, including water pipelines and intakes. This disrupts water supply, causes service interruptions, and incurs high repair costs. For instance, a significant landslide in Kangema in 2023 caused extensive damage to water infrastructure.

▪ Rising Temperatures and Increased Evaporation

Higher temperatures accelerate evaporation rates from both surface water and soil, further depleting water resources. This increases the demand for water, especially in agriculture and livestock, intensifying competition for limited resources.

- **Impacts on Agriculture**

Climate change has led to crop failures, reduced yields, and livestock stress due to erratic rainfall, drought, and water shortages. This exacerbates food insecurity and economic losses for farming communities. Adaptation strategies include water harvesting, conservation agriculture, and the use of drought-tolerant and early-maturing breeds.

- **Water Quality Issues**

Floods and soil erosion contribute to water contamination, making treatment more costly and challenging. Reduced water quality also impacts sanitation, heightening the risk of waterborne diseases.

- **Economic Impacts**

The destruction of agricultural production, water infrastructure damage, and increased repair costs strain the county's economy, reducing livelihoods and increasing poverty levels.

2.1.10 Exposure of WASH infrastructure and of water resources

The county's hilly terrain makes it susceptible to landslides, especially during heavy rains. For instance, a significant landslide in Kangema in early 2025 destroyed several houses and disrupted water supply systems. Such events not only damage infrastructure but also increase the risk of waterborne diseases due to contamination. Heavy rains and floods can damage water pipelines, treatment plants, and storage facilities, leading to service interruptions and increased repair costs. The destruction of water infrastructure during climate-related events exacerbates water scarcity and affects public health.

The county's water resources are increasingly exposed to climate change impacts:

- **Reduced River Flows:**

Climate change has led to decreased river flows in several parts of the county, affecting water availability for domestic and agricultural use. For example, low water levels in rivers have been observed, influencing water supply.

- **Groundwater Depletion**

Over-reliance on groundwater, especially during dry periods, has led to declining water tables and aquifer degradation. This over-extraction, combined with reduced recharge due to changing rainfall patterns, threatens the sustainability of groundwater resources.

- **Water Quality Deterioration**

Floods and heavy rains increase surface runoff, carrying sediments and pollutants into water sources. This contamination not only affects water quality but also increases treatment costs and poses health risks to communities.

Table 3.6 Analysis of climate risks based on hazards and exposure

Climate Hazard	Exposure	Impacts	Vulnerability	Risk Score (1–10)
Droughts	Frequent and prolonged dry spells across all wards; severe in Kakuzi and Ithanga due to sandy soils and low groundwater retention.	Water scarcity, crop failure, livestock loss, decreased river flows, reduced water at intakes.	Medium – Limited storage infrastructure, over-reliance on rain-fed agriculture, and inadequate drought-resilient systems.	2
Flooding	Recurrent in low-lying areas like Maragua and Kiharu, especially along rivers and near flood plains.	Crop destruction, water source contamination, damaged water and sanitation infrastructure, service interruption.	Moderate – Some early warning systems exist, but infrastructure remains exposed and communities are often unprepared.	2
Landslides	Frequent in highland areas such as Kangema, Kigumo, Mathioya, and Muguru.	Damage to pipelines and intakes, displacement of communities, crop and property destruction, fatalities.	High – Steep terrain, poor land use practices, deforestation, and lack of resilient water infrastructure in landslide-prone areas.	5
Temperature Extremes	Increasing heatwaves and warmer average temperatures especially in lower altitudes (e.g., Ithanga).	Increased water demand, crop and livestock stress, higher evaporation from pans/dams.	Low – Limited irrigation systems and energy resources for cooling or pumping water exacerbate vulnerability.	1
Soil Erosion	Widespread in sloped farmlands and deforested catchments like Maragua and Mathioya.	Sedimentation of water sources, reduced dam capacity, degraded farmlands.	High – Poor land management practices, limited reforestation efforts, and weak enforcement of conservation regulations.	5
Water Quality Degradation	Increased during floods and in areas with poor sanitation infrastructure.	Contamination of water sources, increased treatment costs, risk of waterborne disease outbreaks.	Low – Inadequate water treatment facilities, poor sanitation in some rural areas, and limited capacity to test and monitor water quality.	1
Water Shortage	Across most wards during dry seasons; compounded by growing demand and poor storage capacity.	Disrupted domestic and agricultural water supply, conflicts between users, migration in search of water.	Low – Heavy reliance on surface water, low resilience in infrastructure, and inequitable access to alternative water sources.	1

2.2 WATER SUPPLY SERVICES COVERAGE AND GAPS

Domestic water supply coverage in Murang'a County is 70 % implying that 30% of the population does not have access to safe portable water. This exposes the population water borne diseases thereby compromising their social economic status. Therefore, there is need to increase water infrastructure to accelerate access to safe water.

2.2.1 Access to Improved Water Services: Disaggregated by Social Status, Gender and Vulnerable Groups

Definition of "Improved Water Services "

The WHO/UNICEF defines improved water sources to include:

- Piped water into dwellings/plots
- Public taps/standpipes
- Boreholes/tube wells
- Protected springs/rainwater

On the other hand unimproved sources include: Rivers, ponds, unprotected wells, vendor water.

2.2.1.1 Disaggregated water services access data for murang'a

a. By Social Status

Table 3.7 Waters services Acces Data by Social Status

Wealth Quintile	Access to improved water (%)	Primary source	Key Challenges
Richest 20%	78	Piped water (55%, boreholes (23%)	Intermitent supply
Middle 40%	52	Pulic taps (40%,) protected springs	Long queues, high time cost
Poorest 40%	28	Rivers (45%), unprotected wells (30%)	Contamination, distance greater than 1.0 km

Key Insight; The poorest households spend 5 times more time collecting water than wealthy ones.

(Source; KNBS 2019 Census, KDHS 2022, Murang'a County Reports)

b. By Gender

The able below illustrates waters ervices acces data by gender

Table 3.8 Waters serrvices Acces Databy Gender

Indicator	Women/Girls	Men/Boys
Primary Fetchers	82%	18%
Time Spent Daily	2.5–4 hours	Less than 1 hour(if involved)
Decision-Making	15% in water committees	85% control investments
GBV Risks	22% face harassment at sources	Less than 5% report safety concerns

Impact; Girls in water-scarce areas miss 12% more school days than boys.

c. By Vulnerable Groups

The table below illustrates water services access data by vulnerable groups

Table 3.9 ; Water services Access Data by vulnerable groups

Group	Access Rate	Key Barriers	Health Impacts
Persons with Disabilities (PWDs)	19 %	Lack wheelchair-accessible points (only 8% in Murang'a)	Dehydration, UTI risks
Elderly (65+ years)	23%	Reliance on distant sources	Falls, limited mobility
Female-Headed Households	31%	No land rights for boreholes	Child malnutrition-(time-water tradeoffs)
Pastoralist Communities	12%	Seasonal migration disrupts access	Zoonotic diseases

d. Spatial Disparities

Urban (Murang'a Town): 68% piped water access.

Rural Highlands (Mathioya): 45% (protected springs).

-Rural Lowlands (Kandara): 22% (rivers dominate).

e)Hotspots

- Kigumo Sub-County: Only 18% improved access (highest open defecation).

Gatanga: Fluoride-contaminated boreholes affect 40% of households.

(Source: Murang'a Water Sector Report, 2023)

2.2.1.2 . Root Causes of Inequality

1. Infrastructure Bias:

70% of water projects target urban/wealthy areas.

2. Cultural Norms:

Women excluded from technical water roles (e.g., pump mechanics).

3. Policy Gaps:

Little enforcement of Water Act 2016's equity clauses.

2.2.1.3 . Successful Equity Interventions

a. Women-Led Water Kiosks (Kiharu Sub-County)

- Model; Women's groups manage 15 kiosks with subsidized pricing.

-Outcome;-

-60% reduction in fetching time for 3,000 households.

- 100% revenue reinvested in sanitation for schools.

b. Disability-Inclusive Design (Kangema)

- Ramped access points plus handrails ; - 200 PWDs gained independent access.

c. Required interventions

The table below illustrates the theintervention proposed;-

Table 4.0-Intervension on Water access

Priority	Action	Target Group
Gender Equity	Train women as water technicians	Female-headed households
Affordability	Sliding-scale tariffs for the poor	Bottom 40% wealth quintile
Accessibility	Mandate 10% disability-friendly infrastructure	PWDs/elderly
Data Transparency	Public dashboards tracking equity metrics	All stakeholders

Murang'a's water access gaps mirror structural inequalities, with women, the poor, and marginalized groups bearing the heaviest burdens. Targeted, participatory interventions are urgently needed to achieve SDG 6 (clean water for all

2.2.1.4 Water demand projections

Water provision planning is highly dictated by population to be served in the present, future, and ultimate periods of design. Therefore, population projections are important since they are used to compute the water demand for various categories.

Table 4.1 Water demand and their projections

S/No	Name of Water scheme	Total Water Demand Projections (m ³ /day)			
		2020	2024	2028	2030
1	Gatango Scheme	5045	5292	5551	5685
2	Gaturi scheme	3190	3346	3510	3575
3	Mathiya Scheme	5395	5659	5936	6079
4	Kahuti Scheme	14,588	15,301	16,049	16,436
5	Muranga Scheme	3460	3630	3808	3900
6	Gikindu Scheme	1672	1754	1840	1885
7	Kigumo Scheme	15,661	16,427	17,230	17,646
8	Kandara Scheme	27,935	29,301	30,733	31,475
9	Maragua Scheme	2293	2,406	2524	2407
10	Makuyu Scheme	8911	9,347	9804	10,041
11	Gatanga Scheme	7885	8271	8676	8,885
Total		96,035	100,734	105,661	108,014

Source; Water master plan for Murang'a County

Table 4.2 ; Projected water demand for Urban centers in Murang'a

Category	Water demand m ³ /day			
	2020	2025	2030	2035
Murang'a Municipality	5,599	6,054	6,803	7,567
Kenol Municipality	8,418	9,003	12,153	13,755
Maragua town	2,437	2,604	2858	3,104
Kabarti town	547	583	632	681
Kangema town	444	470	504	536
Kiriaini Town	407	432	462	491
Kangari Municipality	528	557	591	625

Kandara town	464	489	519	549
Total	18,842	20,191	24,518	27,306

Source; Water master plan for Murang'a County

2.2.1.5 Non-Revenue Water Status

The Non –Revenue water (NRW) is estimated to be 42.6 % of all water produced in the county and is as result of bursts, leakages, theft, vandalism and meter bypasses.

Table 4.3 : Water services coverage

Name Of Water Company	Water Produced M ³ /Day	Population served	Production per capita (l/c/d)	Consumption per capita (l/c/d)	Non-Revenue Water (%)	Water Coverage in area of jurisdiction (%)
Murang'a South Water and Sanitation company	25,500	351,355	72.5	39.9	45	75
Murang'a west water and sanitation company	16,800	100,061	167.9	82.3	51	64
Murang'a urban water and sanitation company	23,000	99,633	230.8	176.4	24	99
Gatamathi water and sanitation company	10,000	79,693	125.4	51.4	59	59
Gatanga water and sanitation company	12,300	58,846	209.0	137.9	34	34
Total	87,600	689,588	Av.127.0	Av. 97.5	Av. 42.6	Av. 66.2
	Other Community WSPs(Kiarutara Ragia , Gakungu w/p and Private Boleholes)					3.8 %
	Total Coverage					70%

Key: Av =Average, 1 m³/day =1000 litres per day, l/c/d=Litres per capita/ person per day

2.2.1.6 Water Supply Status in the County

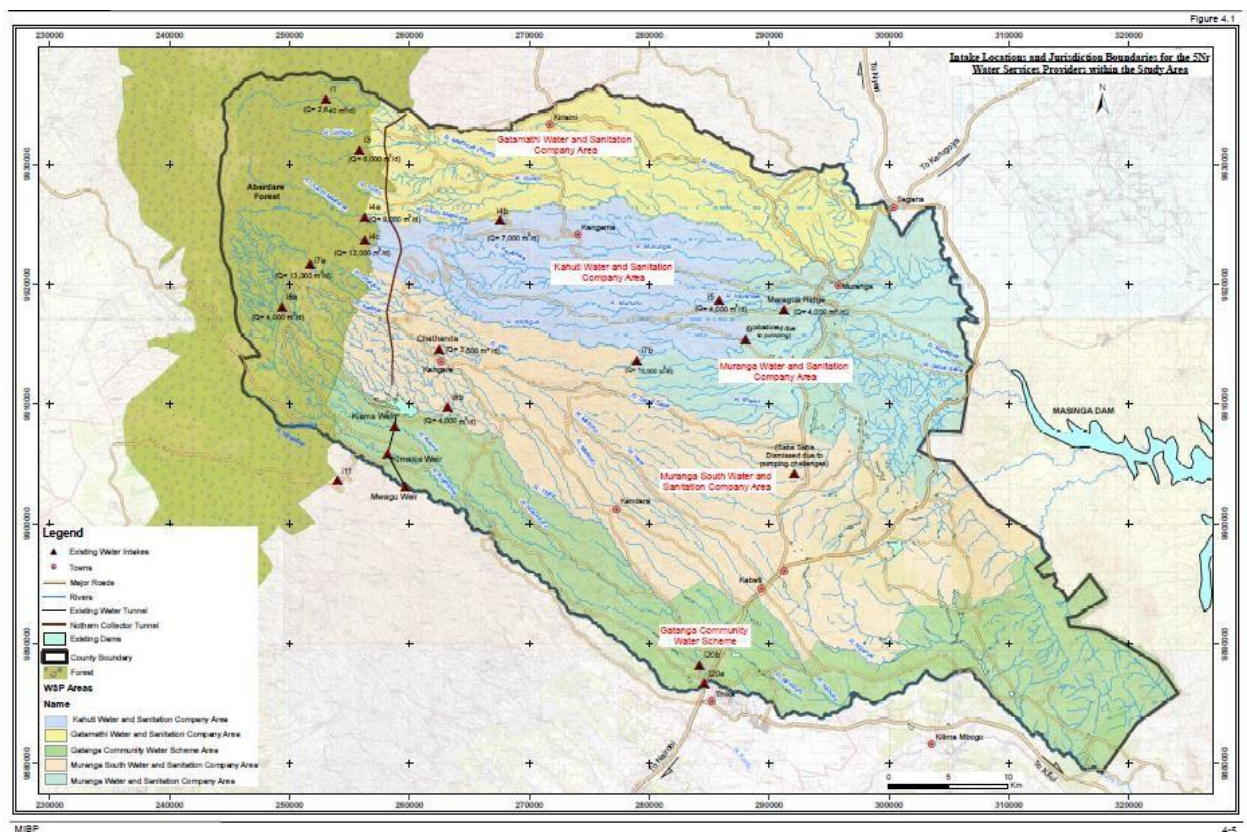
The water resources available in Murang'a County; Rivers, Shallow wells, Springs, Dams, Water pans, Boreholes and Rain water harvesting facilities (roof catchment). There are 12 permanent rivers, 2,740 shallow wells, 95 protected springs, 345 unprotected springs, 85 water pans, 12 dams and 250 boreholes that supply water for domestic and agricultural use in the county. Domestic water and sanitation services in Murang'a County are offered by five water and sanitation companies which cover a jurisdiction of 97 % of the county population. There are also 15 community operated small scale water supply providers that complement these 5 regulated water companies to supply the rest of the county population with water.

Murang'a County has 9 Sub-Counties. These are Kiharu, Maragua, Kigumo, Kandara, Gatanga, Mathioya, Kangema, Kahuro and Ithanga. In Kiharu Sub -County at least 9 out of 10 people have access to safe domestic water. I

In Maragua, Kigumo and Kandara Sub-Counties only 7 out of 10 people access safe water for domestic purposes. For Gatanga and Ithanga Sub-Counties, a maximum of 4 people out of 10 are assured of safe drinking water. In Mathioya, Kangema and Kahuro only 6 out of 10 people enjoy safe domestic water supply.

2.2.1.7 Water Service Providers in the County

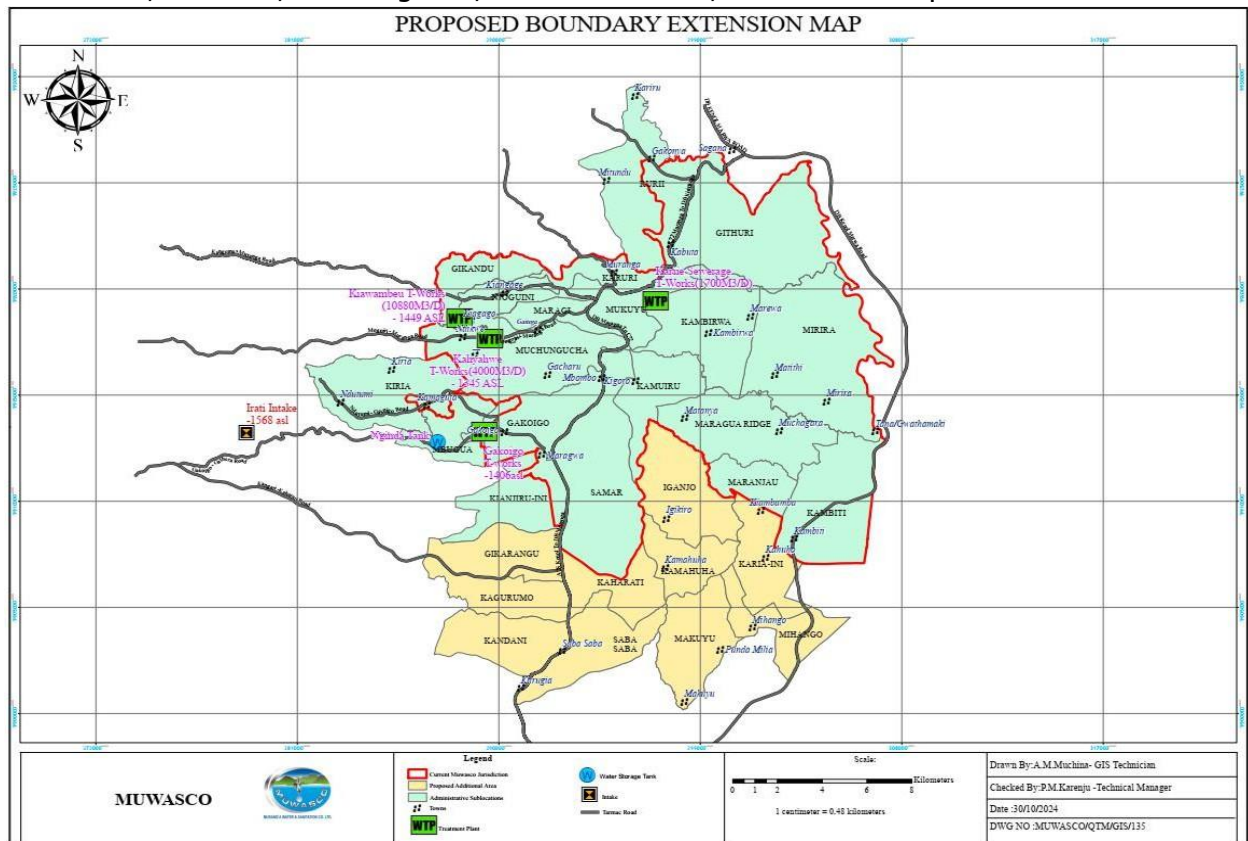
Household water infrastructure in Murang'a County is provided by five water and sanitation companies, namely: Murang'a Water and Sanitation Company Limited (MUWASCO), Gatang'a water and Sanitaitaion Company Limited (GATAWASCO), Muranga South Water and Sanitation Company Limited (MUSWASCO), Murang'a West Water and Sanitation Company Limited (MWEWASCO), and Gatamathi Water and Sanitation Company Limited. The companies are discussed in the next section.



Map 2.5 Existing water supply developments in Murang'a County

a) Murang'a Water and Sanitation Company Ltd (MUWASCO)

MUWASCO operates two water treatments works with a capacity of 5,000 CMPD (current utilization – 1,500 CMPD). The company covers Kiharu, Kahuro, Embassy, Sagana River, Gwathamaki, Mbombo, Muchungucha, Kiria and Ndikwe, as shown in Map 3.3.



Map 2.6: MUWASCO Operation Areas

The identified new areas for water distribution include the eastern part of the Municipality, including Samar and Kamuiru, the Northern parts, including Rurii, Nyakiha-ini and surrounding areas and the Western part, including Kiria and surrounding areas. Other proposed interventions include the proposed Maragua dam that will serve Maragua Town, Samar/Maragua Ridge, Ndutumi, Kahuro, Kiria, Nyakahura, Kiamara, and surrounding areas. On sewerage infrastructure, Murang'a and Mukuyu areas have water closets that are connected to Karie treatment works that MUWASCO also runs. The coverage is about 16% of the households. All the other areas of the Municipality use pit latrines or septic tanks as the means of liquid waste disposal. The latrine coverage of the Kiharu and Kahuro is 93% of the total population.

b) Gatamathi Water and Sanitation Company Ltd

Gatamathi Water and Sanitation comprises Mathioya and Gatango water supply schemes. Mathioya supply scheme covers Njumbi and Gitugi divisions in Mathioya Sub-county, Rwathia and Kihoya locations in Kangema Sub-county. The intake and partial treatment works are located at Miro in Njumbi Division. The scheme was designed to have pumping and gravity water conveyance systems. The Gravity system which works on a rationing schedule serves Kihoya, Kiawambogo, Rwathia and Kenya-Njeru within Rwathia and Kihoya

GATAMATHI PIPELINE LAYOUT

Legend

- LANDMARKS
- TANKS
- SERVICE LINES
- MAIN LINES

MAIN LINES

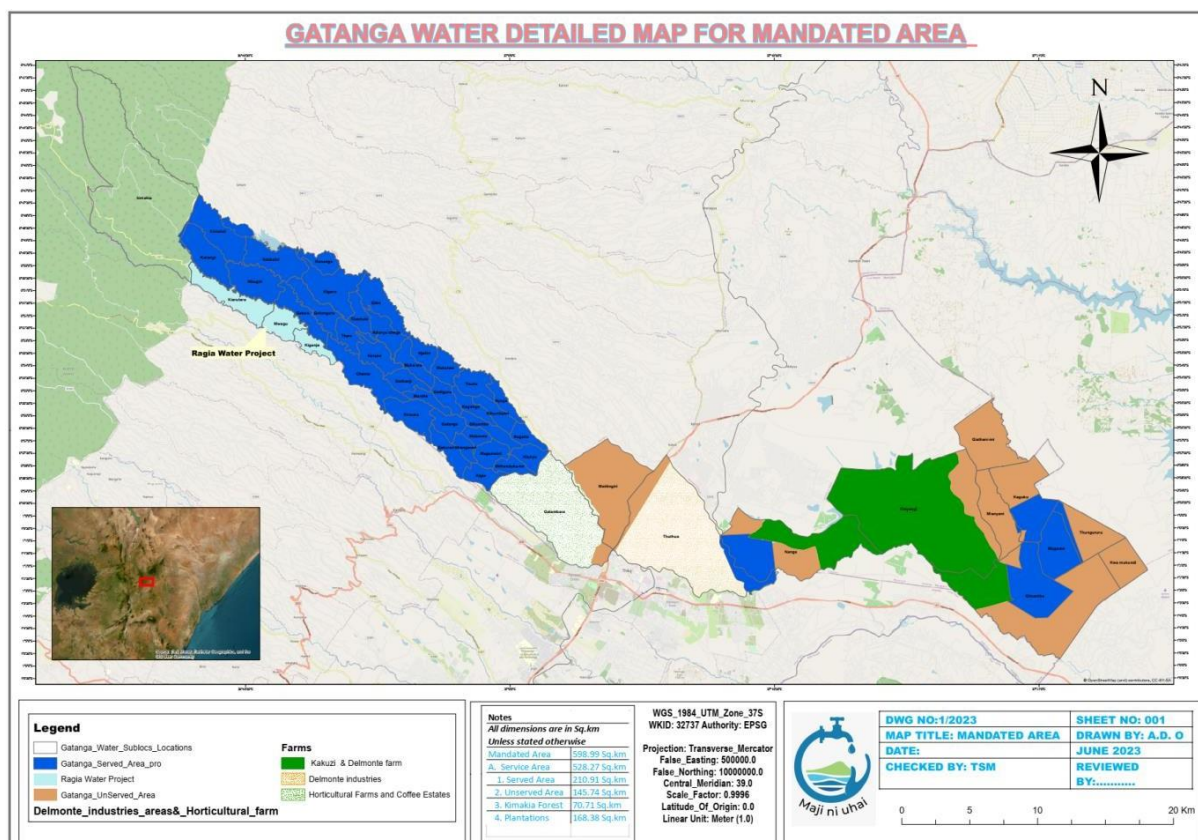
Name	Line Name
MAIN A1	BOJURUWE WA NYISGATHARIDA LINE
MAIN A2	KIMBUU LINE
MAIN C1	KIMBUU THALINE
MAIN C2	WAPUGARA LINE
MAIN C3	INTAKE TO KARIO LINE
	INTAKE TO NIEBERINI LINE
	EDUITY-KAMACHARIA-KARI LINE
	MAIN A
	MAIN B
	MAIN C
	MAIN D
	BOJURUWE LINE
	BOJURUWE -GETIWA-GASANA BRIDGE LINE
	BOJURUWE -GETIWA-GASANA BRIDGE LINE

SCALE 1:40,250

GATAMATHI

Coordinates System: WGS 1984 UTM Zone 37E
 Projection: Transverse Mercator
 Datum: WGS 1984
 False Northing: 10,000,000.0000
 False Easting: 500,000.0000
 Scale Factor: 0.9999
 Units: Meter

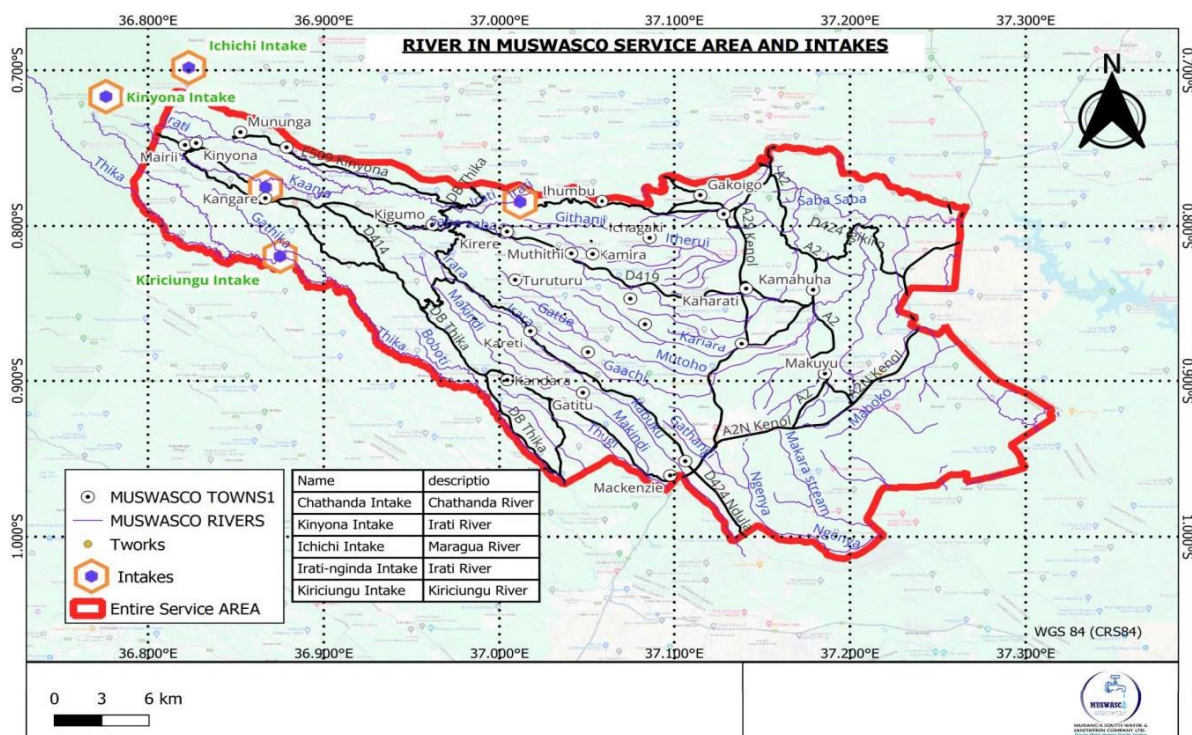
c) Gatanga Water and Sanitation Company Ltd



Map 2.8: GATAWASCO Operation Areas

d) Murang'a South Water and Sanitation Company Ltd (MUSWASCO)

The Murang'a South Water and Sanitation Company Ltd (MUSWASCO) is an agency of the Murang'a County Government that was incorporated in 2008. The Company provides water and sanitation services to the three Sub-Counties of Kandara, Kigumo, and part of Murang'a South. The total coverage area is 934km² serving a population of 497,103 (2024). The intakes are located within Wanyaga and Kinyona, with treatment plant situated in Kinyona area of Kigumo Sub-county. The supply schemes include Gaichanjiru water project, Kenol-Kabati main supply, Maragua bulk water project, Mareira – Kagundu-ini – Kenol line, Kangari-Githumu water project, Mareira – Karimwaro – Makenji line, Makomboki – Gituru and Kambiti water project.

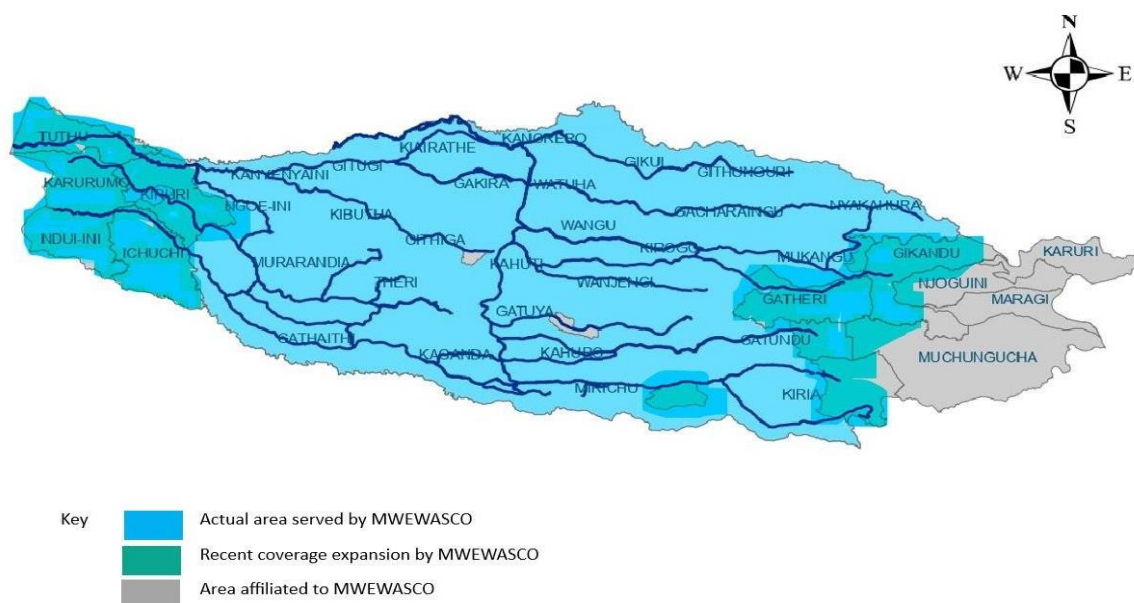


Map 2.9: MUSWASCO Operation Areas

e) Murang'a West Water and Sanitation Company Ltd

The Murang'a West Water and Sanitation Company Ltd (MWEWASCO) is an agency of the Murang'a County Government that was incorporated in 2006. The Company provides water and sanitation services to the Sub-Counties of Kangema and Kahuro. MWEWASCO's area of jurisdiction includes Wangu, Muguru, Kanyenyaini, Mugoiri and Murarandia Wards. The license area of service is 250 Km² with an estimated population of 154,560 (2019 census).

MURANG'A WEST WATER AND SANITATION COMPANY(MWEWASCO) AREA OF COVERAGE



Map 3.0: MWEWASCO Operation Areas

The table 4.4 : Analysis of the water supply status in the County by water service providers.

Name of Water Company	Water	Sub County Coverage	Population served	Wards served	Coverage in area of jurisdiction in percentage (%)
Murang'a Water and Sanitation Company (MUWASCO)		Kiharu	99,633	Mbiri Gaturi Township	99
		Parts of Maragua		Maragua Ridge/ Kambiti Nginda	
Murang'a South Water and Sanitation Company (MUSWASCO)		Maragua	351,355	Kimorori/Wempa Makuyu Maragua Ridge Ichagaki Nginda Kamahuha	75
		Kandara		Ithiru Ruchu Ng'araria Muruka Gaichanjiru Kagunduini	
		Kigumo		Kinyona Kangari Kigumo Muthithi Kahumbu	

Gatanga Water Company (GATAWASCO)	Gatanga	58,846	Kariara Gatanga Kihumbuini Mugumoini	34
	Ithanga		Kakuzi/ Mitubiri Ithanga	
Gatamathi Water and Sanitation	Mathioya	79,693	Gitugi Kamacharia Kiru	66
	Parts of Kiharu		Gaturi	
	Kangema		Rwathia	
Muranga West Water and Saitation company limited (MWEWASCO)	Kangema	100,061	Rwathia Muguru Kanyenyaini Wangu	64
	Kahuro		Murarandia Mugoiri	
	Parts of Kiharu		Mbiri	
Total population served		689,588		Av. 67.6%

Table 4.5: Major Community Managed Water Supply schemes

Name of Water Company	Sub – County Coverage	Population served	Wards Coverage	Coverage in area of jurisdiction in percentage (%)
Ragia Kiarutara water project	Parts of Gatanga	11,100	Part of Kariara	1.5
Gakungu Water project	Parts of Maragua	7,500	Part of Makuyu	0.9
Population served by community schemes		18,600		2.4 %
Total population served in County		708,188	Average Coverage in County =70 %	

Table 4.6 : Water Production and Non- Revenue analysis

Name Of Water Company	Water Produced M ³ /Day	Population served	Production per capita (l/c/d)	Consumption per capita (l/c/d)	Non-Revenue Water (%)	Water Coverage in area of jurisdiction (%)
Murang'a South Water and Sanitation company	25,500	351,355	72.5	39.9	45	75
Murang'a west water and sanitation company	16,800	100,061	167.9	82.3	51	64
Murang'a urban water and sanitation company	23,000	99,633	230.8	176.4	24	99
Gatamathi water and sanitation company	10,000	79,693	125.4	51.4	59	66
Gatanga water and sanitation company	12,300	58,846	209.0	137.9	34	34
Total	87,600	689,588	Av.127.0	Av. 97.5	Av. 42.6	Av. 67.6

Key:

Av =Average, 1 m³/day =1000 litres per day, l/c/d=Litres per capita/ person per day

Private WSPs account for about 2.4 percent coverage making a total coverage of 70 %

2.2.1.8 Water supply coverage assessment

The water supply scenario indicated that Gatanga and Ithanga Sub-Counties have unacceptably low access to safe domestic water supply at 34 percent. A lot of investments aimed at accelerating access to safe water is therefore required in those counties. On the other hand Murang'a South Water and Sanitation company (Muswasco), Murang'a west water and sanitation company (Mwewasco) and Gatamathi water and sanitation company have high percentages of Non revenue water at 45,51 and 59 respectively. Investments focussing reduction of water losses lost through spillage, leaks, bursts, thefts etc should be deliberately made.

2.3 SANITATION SERVICES COVERAGE AND SERVICE GAPS

Kenya has committed itself to achieving the UN Sustainable Development Goal 6.2 which says, “by 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation. The 2019 census data shows that 7.4% of households lack sanitation facilities in Kenya. This equates to around 10% of the population (4.7 million people) who practice open defecation (OD).

The 2019 Census also revealed that OD is more common in rural areas (11.5%) than in urban areas (0.85). Achieving universal access to sanitation will require targeted efforts to accelerate progress in rural areas and ensure no one is left behind. Reasonable standards of sanitation are a constitutional right in Kenya. Responsibility for the provision of sanitation rests with county governments. Universal access to improved sanitation provides health, social and economic benefits.

Concerning access to sanitation facilities in Murang'a County, only 7% of people have access to basic sanitation facilities i.e. use of improved facilities which are not shared with other households. 87.2% of people have access to only limited services i.e. use of improved facilities shared between two or more households and 5.5% have access to unimproved latrines i.e. use of pit latrines without a slab or platform, hanging latrines or bucket latrines.

Murang'a County is one of 21 counties representing only 3% of OD in Kenya with a population of 2,666 and 0.2% of households defecating in the open. (2019 census). Despite low rates of open defecation, the quality of rural sanitation services remains concerning because fewer than 1 in 10 households in the County has access to basic sanitation services with wide intra sub-county disparities. Public/shared sanitation in markets are provided in major markets in urban and peri urban areas.

Sanitation challenges in the county include the 0.2% of households defecating in the open. There are those households using unimproved sanitation facilities that do not adequately separate human waste from people and these facilities are likely to collapse given their poor state of construction. They could be prone to flooding in rainy season and some could be submerged by mudslide.

Table 4.7 Sanitation coverage by sub-county (%)

		Status			
No.	Sub County	Basic	Limited	Unimproved	Open Defecation
1.	Kiharu	23.7	67	8.8	0.3
2.	Kahuro	3.3	93.9	2.5	0.2
3.	Kangema	5	91	3.9	0.1
4.	Mathioya	3.5	91.5	4.2	0.3
5.	Maragua	7.7	84.3	7.4	0.5
6.	Gatanga	5.3	87.6	6.8	0.3
7.	Kigumo	4.2	92.1	3.5	0.1
8.	Kandara	3.8	91.4	4.6	0.1

2.3.1 Percentage of HHs by Main Mode of Human Waste Disposal, Murang'a County

No.	Mode of human waste disposal	Percentage
1.	Pit latrine (covered)	71.4
2.	Ventilated improved pit	15.8
3.	Pit latrine (uncovered)	5.4
4.	Septic tank	4.5
5.	Main sewer	2.3
6.	Open/Bush	0.2
7.	Bio-septic tank/Biodigester	0.1
8.	Bucket latrine	0.1
9.	Cess pool	0.1

2.3.2 On hand hygiene, 8.8% of households have washing facilities near the toilet and 91.2% have no place to wash hands after using toilet.

UNICEF and the Government of Kenya (GoK) have made several efforts to end OD in Murang'a County. Some key achievements include successful establishment of Community Led Total Sanitation (CLTS) as a strategy to help end OD in the county. Ultimately, CLTS focuses on behavior change to ensure that people in communities are held responsible for building and using latrines. UNICEF and GoK also successfully launched and operationalized an online CLTS monitoring tool to help track open defecation free (ODF) progress.

2.3.3 Social and Gender-Disaggregated analysis of Sanitation access

Sanitation access in Murang'a is deeply gendered, with women, girls, and marginalized groups facing disproportionate burdens due to cultural norms, poverty, and infrastructure gaps. Below is a detailed breakdown of impacts on vulnerable groups.

Table 4.9 Gender disparities in sanitation access-Household sanitation coverage

Indicator	Women /Girls	Men /Boys
Access to improved latrines	58% (lower in female-headed households)	72% (male headed households)
Shared/Sanitary Facilities	25% rely on unsafe shared toilets(higher GBV risk)	15% use shared facilities
Open Defecation	12% (women face safety risks)	18% (men cite convenience)

Key Issue: Women prioritize household sanitation but lack control over construction/upgrade decisions.

(Source: KDHS 2022, Murang'a County Public Health Reports)

2.2.4. Impact on Vulnerable Groups

a. Women & Girls-

Health Risks:

- UTIs & Reproductive Infections-: 40% of women report sanitation-related illnesses.
- Menstrual Hygiene Challenges-: 32% of schools lack private, functional toilets ;girls miss 3–5 school days/month.

Safety Risks

22% of women experience harassment/GBV while accessing toilets at night.

Long walks to communal facilities increase vulnerability.

Persons with Disabilities (PWDs)

Physical Barriers: less than 5% of latrines are disability-friendly (no ramps/handrails).

Social Stigma**: 60% of PWDs rely on family assistance, reducing dignity.

Elderly & Chronically ill.

-Mobility Issues: Poor sanitation exacerbates arthritis/continence challenges.

Isolation: Fear of accidents limits social participation.

(Sources: UNICEF WASH Survey 2023, Murang'a Disability Network)

Root Causes of Inequality

a. Decision-Making Power

- Male Dominance: 80% of sanitation budget decisions made by men (county government data).
- Women's Limited Voice: Only 15% of water/sanitation committees are female-led.

b. Economic Barriers

- Cost of Latrines: 45% of female-headed households cannot afford improved toilets (vs. 30% of male-headed).
- Subsidy Gaps: Government programs often bypass widows/disabled households.

c. Cultural Norms

- Taboos around Menstruation: Women hide sanitary waste, risking groundwater contamination.
- Land Ownership: Women own less than 20% of land; they cannot install toilets without male approval.

(Sources: SNV Kenya, Murang'a Gender Department)

4. Interventions

a. Gender-Responsive Policies

- Quotas; Mandate 50% women in sanitation planning committees.
- Targeted Subsidies: Free latrine materials for female-headed/PWD households.

b. Safe and Inclusive Infrastructure

- MHM-Friendly Toilets: Installation of locks, disposal bins, and water in schools/markets.
- Disability-Accessible Facilities: Adoption of Kenya's Universal Design Guidelines.

c. Community Awareness

- Men and Boys as Allies: Training of male leaders on sanitation's link to women's health.
- Break Menstrual Taboos: Enhancement of School-based education programs.

Murang'a's sanitation gaps reinforce gender and social inequities, with women, girls, PWDs, and the elderly bearing the heaviest burdens. Equitable solutions must address cultural norms, economic barriers, and infrastructure gaps through targeted policies and inclusive design.

2.3.5 Public Shared Sanitation

2.3.5.1 Assessment of Public/Shared Sanitation in Informal Settlements & Market Centers

This evaluation examines the availability, adequacy, and gender/social equity** of shared sanitation facilities in high-density areas, focusing on:

1. Coverage gaps
2. Quality and safety concerns
3. Disproportionate impacts on women, vendors & vulnerable groups

1. Availability of Shared Sanitation

(Data Source: Murang'a County Public Health Dept., 2023)

Table 5.0

Location	People per Shared Toilet	WHO Standard	Facility Type	% Functional
Murang'a Town Slums	75:1	≤50:1	Concrete block (60%), pit latrines	45%

Kandara Market	120:1	≤25:1 (markets)	Wooden stalls, no roofs	30%
Maragua Bus Park	200:1	≤50:1	2 broken flush toilets	10%
Gatanga Informal Settlements	90:1	≤50:1	Communal pit latrines	50%

Key Findings:

- All assessed areas exceed WHO standards for user-to-toilet ratios.
- Urban informal settlements (e.g., Murang'a Town slums) face less severe crowding than rural markets (Kandara).

2. Adequacy and Safety Concerns

a. Physical Condition

80% of facilities lack:

- Lighting (GBV risk at night)
- Doors/locks (reported by 90% of women in focus groups)
- Handwashing stations (only 15% have soap/water)

a. Gender-Specific Risks

- Women/Girls:
 - 62% avoid using toilets after dark -urinary infections (35% prevalence in slums).
 - Menstrual hygiene impossible in 80% of facilities (no bins/water).
- Persons with Disabilities (PWDs):
 - Zero accessible toilets in markets/slums.

a. Health Impacts

- Diarrhea rates 2.5 times higher in areas with poor shared sanitation (KDHS 2022).
- Cholera outbreaks linked to flooded pit latrines in Kandara (2023).

3.Table 5.1 Equity Analysis: (Who Bears the Burden)

Group	Key Challenges	Coping Mechanisms
Female Vendors	Pay KES 10 per toilet use (high business costs)	Reduce liquid intake –kidney infections
Children	55% of schools near markets lack toilets	Open defecation in alleys
Elderly	Squatting difficult (arthritis)	Use buckets at home -odor/fly infestations
PWDs	No ramps/handrails	Depend on family members

Root Causes of Poor Sanitation

1. Underinvestment: Only 5% of county health budget targets slum sanitation.
2. Land Tenure Issues: Informal settlements lack title deeds - no permanent toilets.
3. Weak Enforcement: No penalties for landlords violating Public Health Act standards.

Successful Local Interventions

A. "Clean Markets Initiative" (Murang'a Town, 2022)

- Action: Built 10 gender-segregated toilets with MHM rooms.

- Result:
- 40% reduction in diarrheal diseases among vendors.
- 90% women reported improved safety.

B. Community-Led Total Sanitation (CLTS) in Gatanga

- Triggering: Shamed open defecation hotspots via community mapping.
- Outcome: 100% ODF (open defecation-free) villages by 2023.

6. Required interventions

Table 5.2

Priority	Action	Target Beneficiaries
Immediate Repairs	Install lights/locks in all shared toilets	Women/vendors
Affordable Access	Subsidized vouchers for vendors/PWDs (KES 5/use)	Low-income users
Inclusive Design	Build 5 disability-friendly units per market	PWDs/elderly
Policy Reform	Amend county bylaws to enforce 1:50 toilet ratio	All informal settlements

Murang'a's shared sanitation is inadequate, unsafe, and exclusionary, with women, vendors, and PWDs facing the worst conditions. Urgent upgrades plus pro-poor policies are needed to align with SDG 6.2.

2.3.6 Sanitation Challenges

2.3.6.1 Social Norms and their Influence on WASH Practices in Murang'a County

Social norms refer to unwritten rules governing behavior. They profoundly shape water, sanitation, and hygiene (WASH) practices in Murang'a. These norms often reinforce gender inequalities, health risks, and exclusion, particularly for women, girls, and marginalized groups. Below is an analysis of key norms and their impacts.

1. Gender Norms and WASH Roles

A. Water Collection as "Women's Work"

- Norm: Fetching water is culturally assigned to women/girls (seen as "domestic duty").
- Impact
 - Women spend 3–5 hours/day collecting water. This limits education/income opportunities.
 - Men control water infrastructure decisions (e.g., borehole locations), often prioritizing irrigation over household needs.

B. Menstrual Hygiene Stigma

- Norm: Menstruation is taboo; girls are shamed for discussing it openly.
- Impact:
 - 32% of schoolgirls miss class during periods due to lack of private toilets/disposal bins.
 - Women use unsafe materials (rags, leaves) lead to infections.

(Source: KDHS 2022, Murang'a County Education Reports)

2. Sanitation Norms and Exclusion

A. Toilet Construction as a "Man's Role"

- Norm: Men decide if/when to build latrines; women rarely own land for sanitation projects.
- Impact:
 - Female-headed households are 2 times more likely to lack toilets.
 - Open defecation persists in 15% of rural homes (highest in Kigumo).

B. Disability and Age-Based Exclusion

- Norm PWDs/elderly are often viewed as "dependent," not active participants in WASH planning.
- Impact:
 - Less than 5% of public toilets are disability-friendly.
 - Elderly individuals face mobility barriers to pit latrines.

(Source: Murang'a Disability Network, 2023)

3. Hygiene Norms and Health Risks

A. Handwashing as "Optional" for Men

- Norm; Hand hygiene is seen as a "women's concern" for child care.
- Impact
 - Men are 30% less likely to wash hands after toilet use ,this leads to higher diarrheal spread.

B. Cultural Beliefs on Water Treatment

- Norm: Boiling/filtering water is viewed as "unnecessary" if it looks clean.
- Impact
 - 45% of rural households drink untreated water, this leads to typhoid/cholera outbreaks.

(Source: UNICEF WASH Survey, 2023)

Table 5.2 Norms **Perpetuating Inequality**

Social Norm	Negative WASH Impact	Most Affected Group
Men control water points	Boreholes placed far from homes (high women's burden)	Rural women/girls
"PWDs can't maintain toilets"	No accessible sanitation	Persons with disabilities
"Talking about toilets is shameful"	Delays latrine adoption	Entire communities

5. Breaking Harmful Norms: Successful Interventions

A. Community-Led Total Sanitation (CLTS)

- Approach Public "triggering" (e.g., walking through open defecation areas) to spark collective action.
- Result 50 villages in Murang'a declared open defecation-free (ODF) since 2020.

B. Male Champions for WASH

- Approach Train male leaders to advocate for shared water fetching and MHM-friendly toilets
- Result: Kandara Sub-County saw a 40% increase in men contributing to water chores.

C. School Hygiene Clubs

- Approach: Students lead handwashing campaigns, challenge menstrual stigma.
- Result 70% of schools now have MHM facilities (up from 20% in 2018).

(Sources: SNV Kenya, Murang'a County Health Reports)

Table 5.3 **Recommendations for Norm Shifting**

Strategy	Action	Expected Outcome
Gender-Transformative Programs	Engage men in water fetching via media campaigns	Reduce women's time poverty
Inclusive WASH Committees	Reserve seats for women/PWDs in planning	Equitable infrastructure placement
MHM Education	Train boys/men on menstrual health	Reduce school absenteeism for girls

Social norms in Murang'a dictate who fetches water, who owns toilets, and who suffers most from poor WASH. While harmful norms persist, community-led interventions show promise in shifting behaviors toward equity. Targeted advocacy, education, and inclusive policies are critical to sustainable change.

2.3.7 .Service provision challenges and gaps

2.3.7.1 Barriers to WASH Access for Vulnerable Populations in Schools and Healthcare Facilities

Vulnerable groups including persons with disabilities (PWDs), the elderly, and HIV-affected households face systemic barriers to water, sanitation, and hygiene (WASH) in Murang'a's schools and health facilities. These include economic, infrastructural, and social norm challenges, exacerbating health and dignity risks.

1. Barriers in Schools

Table 5.4 Persons with Disabilities (PWDs)

Barrier	Impact	Data
No wheelchair-accessible toilets	Students skip school or risk injury	Only 8% of schools have ramps
Lack of handrails/support	Reliance on peers for assistance leading to stigma	62% of PWDs report humiliation
Distance to facilities	Long crawls/wait times leading to dehydration	45% reduce water intake to avoid trips

(Source;-Murang'a Education Report, 2023) |

B. Elderly Caregivers and Orphans (HIV-Affected)

- Cost Barriers:

- Sanitary pads cost KES 100/month—unaffordable for 60% of HIV-affected households.
- Water tariffs force orphans to prioritize drinking over hand washing.
- Stigma
 - HIV+ children excluded from shared toilets due to myths about contagion.

C. Social Norms

- Menstrual Shame: Girls using rags miss 3–5 school days/month (KDHS 2022).
- PWD "Dependency" Myth: Teachers assume disabled students "can't manage" toilets alone.

2. Barriers in Healthcare Facilities

Table 5.5 PWDs & Elderly Patients

Barrier	Impact	Data
No disability-friendly WASH	Post-surgery patients crawl to toilets	0 of rural clinics have accessible WASH (MOH 2023)
High water costs	Clinics charge KES 20/bucket leading to families ration	30% of HIV+ patients skip hand washing
Overcrowded toilets	Elderly wait hours, leads to soil themselves	1:150 toilet-to-patient ratio (WHO standard: 1:20)

B. HIV-Affected Households

- Discriminatory Design:
 - Separate "HIV+ toilets" in 10% of facilities. This leads to stigma.
- Poor Hygiene Supplies:
 - 70% of clinics lack soap for hand washing (high opportunistic infections).

3. Root Causes

1. Underfunding: Only 5% of county health budgets target inclusive WASH.
2. Norms: PWDs/elderly seen as "burdens," not rights-holders.
3. Policy Gaps: No enforcement of Kenya's Disability Act (2012) in WASH projects.

4. Successful Interventions

A. Inclusive School Toilets (Kiharu Sub-County)

- Action: Built ramped toilets with handrails in 5 schools.
- Result 22% increase in PWD enrollment (2022–2023).

B. "Free WASH for HIV+ Families" (Murang'a Hosp.)

- Action: Provided soap, water vouchers, and private showers.
- Result; 50% drop in skin infections among HIV+ patients.

Table 5.6 Required interventions

Priority	Action	Target Group
Mandate Accessibility	Enforce 1 disability-friendly toilet per school/clinic	PWDs/elderly
Subsidize Hygiene	Free soap/sanitary pads for HIV-affected households	Orphans/elderly caregivers
Awareness Campaigns	Train staff on anti-stigma WASH practices	Healthcare workers/teachers

Murang'a's schools and clinics systematically exclude vulnerable groups through unaffordable, inaccessible, and stigmatizing WASH conditions. Pro-inclusive policies, targeted funding, and norm shifts are urgent to uphold dignity and health.

2.3.7.2 Potential strategies for improving sanitation uptake

According to the 2019 census, OD rates in Murang'a County are low (0.2%). However, the quality of sanitation services remains inadequate and investments in the rural sanitation sector are needed. Most households in Murang'a County have access to either limited or unimproved sanitation services with a high proportion of households sharing latrines. Therefore, investments into CLTS only focus on communities where open defecation remains an issue. In other communities not practicing open defecation, market-based sanitation approach needs to be implemented to improve household and public sanitation across the sanitation value chain.

2.4 ACCESS TO WASH FOR SCHOOLS AND HEALTHCARE FACILITIES

2.4.1 Access to Water, sanitation, hand washing facilities and menstrual hygiene management by Schools

In terms of water access, 521 (81.5%) of schools have water and the main source of drinking water is piped water supply 314 (49.1%), followed by rain water 164 (25.7%) and protected wells and springs accounting for 43 (6.7%) schools. 118 (18.5%) of public ECDE centers and comprehensive schools do not have water. Therefore, 55.8 % of schools have access to basic drinking water.

Of the 639 public primary schools in the county, 82% have pit latrines with slab (basic sanitation facilities), 14% have pit latrines which are shared by both gender (limited sanitation services) and 6% have pit latrines without slab (unimproved services).

24% of public primary schools have access to basic hygiene services i.e. they have handwashing facilities with water and soap. 61% of schools have handwashing facilities with water only while 15% of schools have no hand washing facilities.

No school has a private space for menstrual hygiene management and none has menstrual hygiene management infrastructure (waste bin, hook, mirror, tap and soap).

2.4.2 Access to water, sanitation, hand washing facilities and health care waste management by health care facilities

72% of health care facilities have access to basic drinking water (piped supply) while 28% have access to unimproved water sources (rain water).

75% of health care facilities have pit latrines with slab and pour flush toilets (basic sanitation facilities), 28% have pit latrines which are shared by both gender (limited sanitation services) and 4% have pit latrines without slab (unimproved services).

57.4% of level 2 and level 3 health care facilities have access to basic hygiene services i.e. they have handwashing facilities with water and soap. 16.2% of health care facilities have handwashing facilities with water only while 26.3% of health care facilities have no hand washing facilities near or at the toilet.

Concerning health care waste management, 88% of health care facilities correctly segregate waste into at least three labelled bins while 12% have bins which do not meet all requirements and or waste is not correctly segregated. 88% of health care facilities either treat or dispose of infectious waste by burning in a protected pit, incinerated or burning chamber or not treated but collected for disposal off-site while 12% burn their health care waste in the open.

2.5 WASH plus: Multiple water use services

In Murang'a County, water resources are normally allocated on several categories. These include domestic, industrial and irrigation. The table below shows the projected water demands for each of the above water user categories as obtained from the County Water master plan done by Ahi water works Development Agency

Table 5.7; Summary of Combined Water Demands for Murang'a county

Planning Horizon (Year)	Potable water demand (m³/day)	Livestock water demand (m³/day)	Irrigation Demand (m³/day)	Industrial /commercial demand (m³/day)	Comined demand (m³/day) water
2018	88,883	9,451	93,507	4,260	182390
2020	92,217	9,502	93,507	4,283	185724
2025	94,993	9,631	93,507	4,341	188500
2030	99,264	9,761	93,507	4,400	192771
2035	103,477	10,028	93,507	5,060	196,984

2.5.1 Multiple Water Uses Services (MUS)/WASH+ Assessment.

The water Resources Authority is in vahrge of allocation of water for each of the above categories. Care is taken during the allocation not to deplete any source and deny a deserving water use category water. Small scare agriculture or kitchen gardening is encouraged. This is where rain water harvesting, intallation of water storage tanks at farm level and drip irrigation practices are promoted.

2.5.2 Strategies for integrated water service delivery

The county government of Murang'a as well as the five water service providers each has a strategic

plan which is used to guide water service provision in the county. Gaps are identified, resources mapped, partners identified and designs made. The county government signs performance contracts with the water service providers and quarterly monitoring on performance is tracked. Support is given to the WSPs in terms of budget, water supply improvement facilities and in legislative matters when they arise. Water is supplied to different types of communities in Murang'a. Some are coffee farmers, others tea growers, maize and beans farmers as well as fruit growers. Majority of them keep livestock. The residents earn their income during different periods of the year. Water is supplied to all but flexibility is made during payment of water bills.

Table 5.8 Climate risks affecting wastewater and fecal sludge management

Climate Risk	Impact on Wastewater and Fecal Sludge Management
Flooding	• Inundation of pit latrines and septic tanks, leading to overflow and contamination of water sources. • Damage to sewer networks where present. • Increased risk of disease outbreaks.
Drought and Water Scarcity	• Reduced water availability affects toilet flushing, sewer conveyance, and treatment efficiency. • Dry conditions make sludge harder to remove from containment systems.
Rising Temperatures	• Accelerated decomposition in on-site systems, leading to odors and faster sludge accumulation. • Increased pathogen survival in untreated waste when exposed to open conditions.
Landslides	• Damage to onsite sanitation infrastructure (e.g., latrines, tanks) on unstable slopes. • Disruption of access routes for desludging trucks.

Table 5.9 Opportunities for investment in climate-resilient sanitation services, including sewerage and non-sewered infrastructure

Investment Opportunity	Description / Justification
Decentralized Wastewater Treatment Plants (DEWATS)	• Ideal for urban markets and institutions (e.g., schools, health centers). Low-cost, low-energy, and climate-resilient.
Elevated or Flood-Proof Latrines	• Raised latrines in flood-prone areas (Maragua, Kiharu) to reduce overflow and contamination risks.
Faecal Sludge Treatment Facilities (FSTFs)	• Establish at sub-county level to process sludge from septic tanks and pit latrines.
Climate-Resilient Septic Tanks	• Construct reinforced tanks with sealed covers in landslide and flood-prone areas to prevent leakage and structural failure.
Eco-San Toilets / Urine Diversion Dry Toilets	• Suitable for dry areas (Ithanga, Kakuzi) where water is limited. Reduces water usage and enables reuse of composted waste in farming.
Solar-Powered Desludging Pumps & Trucks	• Enhance mobility and service delivery in areas with poor road access, especially during rainy seasons or emergencies.

Sanitation Safety Planning (SSP)	• Institutionalize risk assessment and control along the sanitation service chain to anticipate and adapt to climate risks.
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CHAPTER THREE

3.0 WATER AND SANTATION SERVICES INSTITUTIONAL STRUCTURE AND FINANCING

3.1 Sector Governance and Service delivery models

Water Services Institutional Framework

The Ministry of Water, Irrigation, and Sanitation is the lead national institution addressing the Water and Sanitation agenda in Kenya. The Constitution of Kenya 2010 under Article 43(1) (d) provides for the right to clean and safe water in adequate quantities to every person. It is the role of the government to provide, protect, and uphold this social economic right.

Part II of the Fourth Schedule further specifies the role of devolved functions of the County Government. The County Government has a mandate to implement specific National Government policies on natural resources and environmental conservation, including soil and water conservation and forestry. It is the role of the County Government to implement inter alia the National Water Act 2016.

The purpose of the Water Act 2016 was to provide for regulation, management, and development of water resources and water and sewerage services. County Governments have a mandate to implement the provisions of this Act. Further, the Act requires County Governments to establish water services providers. Pursuant to Section 158 of the Act, County Governments shall comply with the standards of commercial viability set out by the regulatory Board.

Similarly, the schedule confers the County government the mandate to provide for water and sanitation services. This implies that it is the obligation of the county to legislate on this functional area. The County Government Act, 2012 Act established the County Governments and in Section 5 expressly states that the functions of the County Governments are as set out in the Constitution of Kenya 2010. The Act gives the County Government authority to govern and create legislation on their functional areas.

Kenya Vision 2030 is based on the three pillars, namely, economic, social, and political interests. It recognizes that water is necessary to enable the Vision by ensuring that Kenyans have access to water and improved sanitation by year 2030. The Vision specifically proposes to address the following challenges that affect Murang'a County: Water security, catchment management, increased water demand and better quality water.

The objective of the social economic pillar inter alia is to ensure that water and improved sanitation access to all is achieved by 2030. Murang'a County is committed to ensure efficient water resource management for economic growth, poverty reduction and health through the strategic formulation. The County Government is mandated to develop strategies for the management of the water service providers. Additionally, every County Government is obligated to put in place measures for the provision of water services to rural areas, which is considered not to be commercially viable for the provision of water services. The measures referred to in subsection (2) include the development of point sources, small scale piped

systems, and stand pipes which meet the standards set by the Regulatory Board and which may be managed by the community associations, public benefits organizations, or a private person under a contract with the County Government.

3.1.0 Role of Community in Mangement of Water Systems

3.1.1 Community-Managed Water and Sanitation Systems in Murang'a County: Effectiveness, Challenges, and Support Needs

Community-managed WASH systems play a critical role in Murang'a County, where decentralized governance helps improve access in rural and peri-urban areas. However, these systems face sustainability challenges, financial constraints, and governance gaps. Below is an analysis of their effectiveness, key challenges, and required support.

A) Effectiveness of Community-Managed Systems

Table 6.0 Existing Water Supply Systems

Indicator	Performance	Example
Coverage	Approx. 40% of rural water supply managed by communities	Kiharu Water Project serves 5,000 plus people
Cost Recovery	60-70% of systems collect user fees	Gatanga's rainwater project sustains operations via tariffs
Equity Impact	Women-led systems show higher maintenance rates	Nyakianga Women's Group manages a borehole

B. Sanitation (CLTS & Latrine Programs)

- Open Defecation Free (ODF) Success: 50 plus villages certified ODF through Community-Led Total Sanitation (CLTS).
- School Sanitation: 30% of rural schools have student hygiene clubs maintaining toilets.

2. Key Challenges;

Table 6.1 Financial Sustainability

Challenge	Impact	Data
Low Tariff Collection	Systems collapse post-donor funding	40% of projects fail within 5 years
High Maintenance Costs	Broken pumps remain unrepaired for months	KES 50,000–100,000 per borehole repair
Exclusion of the Poor	Fixed tariffs lock out vulnerable households	25% of families borrow money to pay water fees

B. Governance and Technical Gaps

- Weak Leadership: 70% of water committees lack training in financial management.
- Gender Imbalance: Only 20% of committee leaders are women.
- Technical Failures: Poor siting of boreholes leads to dry wells (e.g., Kandara 2022).

C. Climate Vulnerabilities

- Droughts reduce water yields leading to conflicts over resources.
- Floods damage sanitation infrastructure (e.g., Maragua River toilets).

Table 6.2 Critical Support Needs

Support Area	Required Interventions	Expected Impact
Financial Strengthening	Training on tariff setting and bookkeeping	Improved cost recovery (high sustainability)
Technical Capacity	Skilling committees in basic pump repairs	Reduced downtime of water points
Gender Inclusion	Quotas for women/PWDs in water committees	More equitable service delivery
Climate Adaptation	Rainwater harvesting and flood-proof toilets	Reliable supply during droughts/floods
Government Partnerships	County subsidies for poorest households	Ensures affordability for vulnerable groups

4. Successful Models in Murang'a

A. The Kigumo Community Water Project Approach

- Blended financing (user fees plus county grants).
- Women-trained mechanics maintain pumps.
- Result 92% functionality rate since 2019.

B. Mathioya's CLTS Program

- Approach
 - Community "triggering to shame open defecation.
 - Local artisans build affordable latrine slabs.
- Result 100% ODF villages by 2023.

5. Recommendations for Scaling Success

1. Adopt Hybrid Management: Partner with private operators for professional oversight.
2. Leverage County Funds: Allocate 5% of Murang'a's water budget to community systems.
3. Promote Inclusive Design: Universal access standards for PWDs/elderly.

Community-managed WASH systems in Murang'a improve access but struggle with finances, governance, and climate shocks. Targeted support in capacity building, gender equity, and climate resilience can enhance their impact.

3.1 PPP Opportunities

3.1.2 Addressing Social Considerations in PPPs for Water & Sanitation in Murang'a County: Pro-Poor Strategies

Public-Private Partnerships (PPPs) can improve water and sanitation services, but without safeguards, they risk excluding vulnerable populations. Here's how Murang'a County can embed pro-poor tariffs, service obligations, and regulatory oversight to protect community interests.

Table 6.3 Pro-Poor Tariffs: Ensuring Affordability

Challenge: Flat tariffs disproportionately burden low-income households.

Solutions:-

Approach	Implementation	Example
Sliding-Scale Tariffs	Base fees on income levels (e.g., approx.KES 5,000/month pay 50% less)	Nairobi's Water Sector Trust Fund subsidies
Lifeline Tariffs	Free minimum daily water (e.g., 20L/household)	South Africa's Free Basic Water Policy
Cross-Subsidization	Higher industrial/commercial users subsidize poor households	Mombasa's industrial water pricing

Action Required :

- Amend County Water Act to mandate tariff equity.
- Pilot smart-card systems for discounted water access in informal settlements.

2. Service Obligations: Guaranteeing Universal Access

Challenge: Private operators may neglect low-revenue areas.

Table 6.4 Contractual Safeguards

Clause	Requirement	Enforcement Mechanism
Universal Coverage	Serve all households, including slums/rural areas	Penalize operators for unmet targets
Gender-Responsive Design	Build toilets with MHM facilities in schools/markets	County health inspections
Disability Access	10% of water points must be	Compliance linked to contract

	wheelchair-friendly	renewal
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3. Regulatory Oversight:

Protecting Public Interest;-

Challenge: Weak monitoring leads to exploitati

Table 6.5 Key Oversight Tools:

Mechanism	Function	Murang'a Adaptation
Independent Regulator	Audit tariffs/service quality (e.g., WASREB)	Empower Murang'a Water Services Board
Community Ombudsman	Resolve complaints from vulnerable users	Train local NGOs as watchdogs
Transparency Platforms	Public dashboards tracking PPP performance	Partner with ICPAK for accountability

4. Addressing Equity Risks in PPPs

A. Risk Private operator prioritizes profits over poor households

- Mitigation

- Capping returns on investment (e.g., max 12% profit margin).
- Require 5% of revenue reinvested in pro-poor infrastructure.

B. Risk: Marginalized groups excluded from decision-making

- Mitigation

- Reserve 30% of oversight committee seats for women, PWDs, and slum representatives.
- Hold annual participatory budgeting forums.

5. Case Study: Pro-Poor PPP in Kirinyaga

Model

- Private operator Water and Sanitation Co. partnered with farmers' cooperatives.
- Lifeline tariffs for 10,000 low-income households.

- Result

- 98% coverage in rural areas; no disconnections or non-payment.

6. Required interventions

1. Policy Reform Pass a County PPP Act with pro-poor clauses.
2. Pilot Project: Launching a slum-focused PPP in Murang'a Town with:
 - Subsidized tariffs for HIV-affected households.
 - Free sanitation for primary schools.
3. Civil Society Role: Engage MUWASCO (Murang'a Water and Sanitation Co.) to advocate for equity.

PPPs can succeed in Murang'a if designed with pro-poor tariffs, strict service obligations, and participatory oversight

3.1.3 Revenue generation model

Water Service Costs vs. Willingness to Pay (WTP) Across Income Groups in Murang'a County

Access to affordable water remains unequal in Murang'a, with low-income households spending a higher % of their income on water compared to wealthier groups. Below is a breakdown of costs, affordability, and payment willingness based on income levels.

1. Actual Water Costs by Income Level

(Data Source: Murang'a Water Regulatory Compliance Reports, KNBS 2023)

Table 6.6; Actual Water Costs by Income Level

Income Group	Average Monthly Income (KES)	Water Source	Monthly Water Cost (KES)	% of Income Spent on Water
Low-Income (Bottom 20%)	≤5,000	Vendors, unprotected wells	800–1,200	16–24%
Lower-Middle (Next 30%)	5,001–15,000	Public taps, shared boreholes	500–800	5–10%
Middle-Income (Next 30%)	15,001–50,000	Piped water, private tanks	150–300	2–4%
High-Income (Top 20%)	50,000 plus	Piped water (direct connection)	300–600	<1%

Key Findings:

- Poorest households pay 4–6 times more per liter than wealthy ones (vendors charge KES 10–20/20 per liter versus KES 5/20 per litre).
- Informal settlements (e.g., Murang'a Town slums) rely on costly water trucks during droughts (High to KES 1,500/month).

3.1.4 . Willingness to Pay (WTP) for Improved Services

(Source: World Bank WTP Survey in Murang'a, 2022)

Table 6.7 Willingness to Pay (WTP) for Improved Services analysis

Income Group	WTP for Piped Water (KES/month)	WTP for Clean Toilets (KES/month)	Barriers to Payment
Low-Income (KES 5,000) Prefer "pay-as-you-fetch" due to irregular income	200–400	50–100	High upfront connection fees
Middle-Income	500–800	150–300	Fear of unreliable supply (intermittent piped water)
High-Income	1,000 plus	500 plus	- Prefer private solutions (boreholes, tanks)

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Notable Trends

- Low-income WTP is below actual costs; affordability gap.
- Middle-income willing to pay if service reliability improves.

3. Impact of High Water Costs on Vulnerable Groups

A. Female-Headed Households

- Spend 12–15 hours/week fetching water ; leads to lost income (low productivity by approx. 30%).
- 60% sacrifice food/education budgets to pay water vendors.

B. Persons with Disabilities (PWDs)

- 2 times higher costs: Pay helpers to fetch water (average KES 200/day).
- Limited WTP: 70% cannot afford connection fees.

C. HIV-Affected Households

- Health trade-offs 40% skip antiretroviral drugs to buy water.

(Sources: Murang'a Public Health Reports, UNICEF Kenya)

4. Policy Recommendations for Equity

Table 6.8 Pro-Poor Tariff Reforms

Intervention	How It Works	Target Group
Lifeline Tariffs	Free first 6m ³ /month (20L/day)	Low-income households
Sliding-Scale Billing	Income-based discounts (e.g., 50% off ≤KES 10,000/month)	Informal settlements
Connection Subsidies	Waive KES 5,000 fee for poorest 20%	Female-headed households, PWDs

B. Service Reliability Improvements

- Guaranteed daily supply to boost middle-income WTP.
- Mobile water ATMs for prepaid, affordable vending in slums.

C. Regulatory Safeguards

- Price caps on water vendors in drought-prone areas (e.g., Kandara).
- Transparency dashboards tracking disparities in water spending.

5. Case Study: Nairobi's Pro-Poor Water Model

- Approach:
 - Staggered tariffs: KES 18/m³ for 0–6m³ (lifeline), KES 50/m³ for 30m³ plus.
 - Subsidized connections: KES 1,000 for slum households (vs. standard KES 7,500).
- Result 300,000 plus low-income users gained access (2018–2023).

Murang'a's poorest households face crippling water costs, while middle/high-income groups underpay

relative to means. Pro-poor tariffs, targeted subsidies, and stricter vendor regulation can bridge this gap.

3.1.5 Water Management

There are several institutions charged with water management as created by the water Act 2016. The table below shows the various institutions and their roles;

Table 6.9 : Institutions in the water sector

S/No	Institution	Role	Remarks
1	The County Government	Oversite role to ensure all citizens access water, legislative role to ensure water is managed efficiently and is affordable to the citizens, Allocation of budget to increase accessibility of water to the people in the county and finally oversees the operations of all water services providers within the county. The county owns all the assets and liabilities of all water infrastructure within the county boundaries.	Participates in water conservation efforts within the county, carries out water supply programmes to benefit the citizens from its own budget.
2	Water services Providers- (water companies)	Responsible for direct provision of water services to the people – Reports to the County Government	Uses generated revenue to operate and Maintain water supply facilities
3	Water Services regulatory Board	Regulates and sets standards for all water services providers in the country by setting and enforcing domestic water provision standards.	This is the regulatory arm of the sector-sets water tariffs with consultation with the WSPs.
4	Water sector Trust Fund	Supports water services providers with conditional financial loans to develop their water supply systems –such facilities must be guaranteed by the county Government.	Receives development funding from donors as well as the central government. All its activities within the county are approved by the County Government.
5	Water Works Development Agencies	There are 8 such agencies whose role is to support water services providers by developing major capital expenditure water projects. Murang'a is under Athi water works development Agency	Receive development funding from donors as well as the central government. All its activities within the county are notified to the County Government.

3.1.6 Major Stakeholders in the implementation of the CWSS&IP

Each stakeholder category has a specific impact and influence on County implementation of the CWSS&IP (2024-2028). Table 6.1 below provides a summarized analysis of the key

Stakeholders, the name of the institution, and the role it plays in the implementation of the strategic Plan

Table 7.0 : Stakeholders’ arrangement in the Implementation of the CWSS&IP

S/No.	Institution	Role in Implementation of the CWSS&IP
1.	County Executive Committee	• Monitor the process of planning, formulation and adoption • Facilitate its coordination within the County, and alignment with the plans, strategies and programmes of national and county governments. • Take appropriate steps to resolve any disputes or differences arising from its planning, formulation, adoption or review
2.	County Assembly	• Approve the budget and expenditure of the county government in accordance with Article 207 of the Constitution, and the legislation contemplated in Article 220(2) of the Constitution, guided by Articles 201 and 203 of the Constitution • Approve County Development Planning
3.	County Government Departments	• Implementation of programmes and projects in the CWSS&IP • Quality and timely service delivery • Adherence/compliance with the CWSS&IP
4.	County Planning Unit	• Coordinating integrated development planning and policy within the county management framework • Ensuring linkages between county plans and the national planning framework • Ensuring meaningful engagement of citizens in the planning process • Collection, collation, storage and updating of data and information required for the implementation of the CIDP
5.	Ministry of Water, Irrigation and Sanitation	• In charge of Policy formulation
6.	Office of the County Commissioner	• Facilitation and coordination of citizen participation in the development of policies and plans and delivery of service • Provision and maintenance of infrastructure and facilities of public services
7.	Other National Government Departments and Agencies at the County. (WASREB, WSTF, AWWDA and WRA)	• Water services regulation • Collaboration and partnership • Formulating a national vision, periodic plans and policies for development.
8.	Development Partners	• Financial support on Projects/programmes and technical assistance
9.	Civil Society Organizations	• Development support and mobilization of the Civil Society • Monitor government policies and actions and hold government accountable. • Unite people to advance shared goals and interests • Leads in taking action that safeguards public interest like litigating and drafting petitions and policy papers

10.	Private Sector	• Collaboration and partnership • Private sector businesses leverage governmental assets and resources while developing, financing, owning and operating public facilities or services
11.	Suppliers and Contractors	• Timely provision of quality products and services
12.	Local communities	• Responsible citizenship • Support to programmes implementation
13.	Office of the Auditor General	Responsible auditing and reporting on the accounts of any entity that is funded from public funds
14.	Office of the Controller of Budget	To oversee implementation of Government budgets through timely authorization of withdrawals from Public Funds and reporting on utilization.
15.	Local, national, regional, international NGOs and professional Institutions (e.g., WWF, WRI, IUCN, OXFAM, World Vision)	• Support innovations, demonstrations and pilot projects thus overcoming short comings of the government in development. • Financial and technical assistance and training to government officials in development
16.	Development Partners (e.g., World Bank, Africa Development Bank, IMF, EU and USAID)	Promoting long term development and poverty reduction by providing technical and financial support to implement projects
17.	UN agencies (UNICEF, UNDP)	Support Sustainable Development
18.	Faith based organizations (ACK, PCEA, Catholic & Islamic Faith)	Promote social-economic development of the society

3.2 SECTOR FUNDING ARRANGEMENTS

3.2.1 County Government

The County Government of Murang'a is one of the 47 counties in Kenya. It is mandated to develop strategies for the management of the water service providers. Additionally, every County Government is obligated to put in place measures for the provision of water services to rural areas, which is considered not to be commercially viable for the provision of water service. The county will continue to finance annually provision of water and sanitation service in the county. In the last three years, the county Government has provided over Kshs 2.445 Billion towards development of water and sanitation in the county.

3.2.2 The water Sector Trust Fund

The National water act 2016 created several institutions to develop water supply infrastructure and provide funding for the same. The water Sector Trust Fund (Water Fund) is a Kenyan State Corporation under the Ministry of Water, Sanitation and Irrigation and

established under the Water Act, 2016, with the mandate to provide conditional and unconditional grants to the Counties and to assist in financing the development of and management of water and sanitation services in the marginalized and underserved areas. Fund supports water supply and sanitation projects for low income urban area, support implementation of water supply and sanitation for underserved rural communities, supports to communities to effectively manage and conserve their water resources within their catchments and also supports towards water and sanitation projects in urban low income areas financed through commercial loans which are then subsidized on achievement of agreed targets. The county government will continue partnering with Water Fund to accelerate access to Water and sanitation in the county as well as assist the communities access loan facilities from the state agency.

3.2.3 Athi Water Works Development Agency

Athi Water Works Development Agency (AWWDA) is one of the nine (9) Water Works Development Agencies (WWDA) established under the Ministry of Water, Sanitation & Irrigation. It was established under the Water Act 2016 vide Legal Notice No. 28 of 26th April 2019.

The Agency is responsible for the development, maintenance and management of water and sewerage infrastructure in the counties of Nairobi, Kiambu and Murang'a Counties covering 5,800.4Km² with a total population of 9,320,287 people. Currently, the Agency has a bulk water production capacity of 664,337m³/day and a wastewater treatment capacity of 210,500 m³/day. The county Government of Murang'a will continue partnering with Athi Water to accelerate access to water and improved sanitation.

3.2.4 Public Private Partnerships

Murang'a County will continue to partner with private entities to accelerate access to water and improved sanitation. In the last two years the private sector has facilitated drilling of boreholes that has highly impacted on the population of Murang'a county. Equity Bank , East Africa Breweries , Delmonte, Kakuzi, university of Murang'a, and cooperative bank are some of the partners that have worked with Murang'a county in water and sanitation activities in the past. Greater cooperation is anticipated in the years ahead.

3.2.5 County Water sector debts;

The county gvernment of Murang'a does not have any virifiable debt in the water sector. Hoever water service providers have minimal commercial loans which are paid using WSPs revenues on a monthly basis. Wayer bills for health care facilities owned by the county government are usually met.

3.2.6 Pricing structures and their effectiveness

The water Sector Regulation Board (WASREB) is a National Government agency created by the Water Act 2016 and charged with regulatory roles in the water sector. Pricing of water is governed by cost recovery and commercially viability considerations. Water service providers forward their pricing requirements to WASREB when tariff adjustments are required.

Relevant data on water production levels, water demand levels, coverage, expenditure, cost of water production, non revenue water, investments projections, service gaps etc is forwarded as basis for tariff review. Public participation follows and the county government is required to give a no objection letter to the process. If the new tariff adjustments are passed and gazetted by WASREB, the WSP is required to start implementing them after one calendar month.

3.2.7 Willingness and ability to pay for water

Murang'a residents are able and willing to pay for water services. Gaps in efficiency in service delivery and service hours are the major issues. However some consumers tend to use domestic water for irrigation purposes thereby attracting huge water bills that are not affordable. This discourages and attracts penalties from the water service provider.

3.2.8 Issues affecting long term financial viability

Water service providers normally request for tariff adjustments to cushion the companies from inflation where cost of fuel, materials etc rise over time. In semi arid areas such as Ithanga sub-county, revenues are low because not many residents are connected with water. Water infrastructure is still low in the area. A commercial loan may be difficult to qualify or sustain re-payments. Non-revenue water also contributes to non viability of WSPs. The cost of reduction of NRW something becomes unaffordable. Water losses deny companies the much needed revenue. However in most of the WSPs, long term financial viability is there.

3.2.9 Strategies for improving revenue collection.

The water services regulator requires every WSP to meet collection efficiency of 85 % and above. All of the WSPs in Murang'a are currently meeting that threshold. Automation such as smart meter reading, electronic payment of bills, on line enquiry services among others highly contribute to the high efficiency level of revenue collection.

Revenues could be increased by reduction of both commercial and technical losses, supplying water to unserved and underserved areas and well as upgrading customer care services. Upgrading on Community Social responsibility projects that resonate with the community increases confidence of consumers in their WSP. This can be exploited.

CHAPTER FOUR

4.0 PLANNING SCENARIOS AND OPPORTUNITIES TO ACHIEVE COUNTY-WIDE UNIVERSAL ACCESS

4.1 Sector Historic Expenditure Patterns

The water sector has over the years been receiving funding from the county government. The table below shows funding trend in the sector.

Table 7.1 Historical expenditure patterns

S/No.	Year	Programme	Activities	Out Put	Amount In Kshs (Millions)	Source Of Funds	Percentage of GCP
1	2013/2014	Water development	-intake construction -laying of water pipelines	Households connected with domestic and supply	300	County Government	12.0 %
2	2015/2016	Water development	laying of water pipelines	Households connected with both domestic and irrigation water supply	180	County Government	7.2%
3	2016/2017	Water	Water distribution & borehole drilling	Households connected with both domestic and irrigation water supply	420	County Government	16.9 %
4	2017/2018	Water	Water connectivity and sewerage connectivity	Household water distribution and sewerage connections.	555	County Government	22.4 %
5	2018/2019	Water	Water for irrigation, Water distribution and sewer connectivity	Households connected with both domestic and irrigation water supply	435	County Government	17.5 %
6	2019/2020	Water			120	"	4.8 %
7	2020/2021	Water			90	"	3.6 %

8	2022/2023		-Water production-boreholes -Water distribution pipelines -Water kiosks		85	County Government	3.4 %
9	2023/2024		Water production-boreholes -Water distribution pipelines		131	County Government	5.3 %
10	2024/2025				129	County Government	5.2%
Total Kshs.					2,445 B		

- **Comparison of budgetd versus actual expenditure**

In Murang'a County, development budget is absorbed to over 80 percent in the water sector. Gaps exist when disbursements of equitable share from the National Government is delayed or is not forthcoming.

- **Assessment of efficiency in resource utilisation**

In tye FY 2023/2024 Kshs 112 milion out of 131 million was utilized by the close of the financial year. This was 85.4 percent. This has been the trend over all the finanacial years.

4.1.2 WSP Service Coverage Scenarios, Investments and Reform Needs

Investment and Reform Needs

The County Government intends to increase investments in the following areas. This will accelerate access to water services provision. The investments are based on the five registered and regulated water service providers. These are Murang'a South, Murang'a Urban, Gatanga, Gatamathi, Muranga West Water and Sanitation companies as tabulated below.

4.1.3 Murang'a South Water and Sanitaitaion Company Limited (Areas of coverage Kigumo,Maragua and Kandara Sub-Counties)

Interventions	Constituency	Ward	Areas Served	Estimated Budget (Kshs. M)	Remarks
Short Term Interventions					
15km DN225 HDPE Makomboki - Gituru Pipeline	Kandara	Ruchu	Gituru, Kiawangenye, Kiangari and Gacharage	50	Area currently served from an existing system from Gatanga WSP on rationing basis
13km DN250 HDPE Mareira - Karimamwaro Pipeline	Kandara	Ithiru	Karimamwaro, Nguthuru, Mathiuthi	65	Ommitted scope from the BMK project. The distribution already done by BMK does not have a water source.
Rehabilitation of Kandara Bulk water pipeline, laboratory works and rehabilitation of the treatment works	Maragua, Kigumo	Kinyona, Kigumo, Muthithi	Summary, Iganjo, Kamahuha, Makuyu, Ciumbu	55	The mainline delivers low volumes than the designed capacity. Study already conducted by Losai Management Limited
Borehole Solarization within Muranga South (9-Kigumo, 19- Kandara, 19- Maragua)	Kandara, Maragua and Kigumo	Kimorori, Kigumo, Kahumbu,Muthithi, Ithiru, Muruka, Kagundu-ini	Muirini, Ngararia, Nguthuru, Karimamwaro, Kiabage, Kaburugi, Kariti, Kangangu, Wempa chief, Senior Gichohi, PCEA Mangoto, Kambiti, Kandani, Sabasaba office, Mwema, Turuturu, Kiiriangoro,	30	Very high operational costs associated with power

Solar pumping system for the Ciumbu residents from Mugira Dam and also MURI Dam water pumping system	Maragua	Makuyu, Kambiti	Ciumbu, Mihango	95	Ciumbu tank has no water yet the dam is about 2Km from the tank. there exists water distributions in the area
Ciumbu-Mithini Project-15km HDPE Pipeline	Maragua	Makuyu	Makuyu, Miharati and Mithini	85	No pipeline at all, source of water from the Maragua Dam
Kiriciungu treatment works expansion and raising of the of the weir by 5m	Kandara	Ruchu	Githumu, Gacharage, Kiangari	68	Intake shared with irrigation system and low flows experienced during dry season. There is no scouring mechanism for the Treatment plant
Maragua Bulk water Pipeline extensions to Summary, Mbombo, etc	Maragua	Ichagaki, Kamahuha	Maragua town and environs	150	Maragua Bulk is at 96% complete and the project lacks distribution networks to the the consumers
Replacement of Asbestos in Kinyona Treatment works	Kigumo	Kinyona	Kinyona	2	Staff houses and the Aministration Offices are all roofed with asbestos
Desalination of Sabasaba borehole and Karugia borehole	Maragua,Kandara	Gaichanjiru, Kamahuha	Sabasaba and Karugia areas	13	These boreholes have artesian aquifers but the water is not consumed due to salt levels.
Rehabilitation of Mareira - Mathare-ini - Githembe Pipeline with HDPE of 250mm diameter for 18Km	Kigumo	Kahumbu	Mareira, Mathareini, Kandiri, Githembe, Mugumo-ini, Kanguku, Kandani, Sabasaba	115	The line is of mixed diameters of 200mm ,160mm and even 110mm.This causes high NRW

Rehabilitation of Chathanda intake, CFU and system rehabilitation	Kigumo	Kigumo, Kahumbu	Kigumo, Muthithi	30	Existing water intake but not treated. Water is too turbid to be used
25.5Km of DN280 HDPE Maragua - Ichagaki Pipeline	Maragua	Ichagaki	Ichagaki	70	Pipeline already affected by road contractor and not replaced for 3 years now
Kigumo water distributions pipelines	Kigumo	Kangari	Nguku, Iriguini, Kaimiri, Githima, Migua-ini, Mathare-ini, Gathugu-Karambia, Gatune, Gitugu	21.58	Water available but currently no distribution for the said areas
Construction of a full equipped Lab in Kinyona Treatment Works	Kigumo	Kinyona	Kinyona	4	Currently, there is no Laboratory, so most tests are done in Kiriciungu
Completion of Kitui-Matuu pipeline	Kigumo	Kigumo/Kandara	Karimamwaro, Nguthuru, Makenji	Project under BMK	
Last mile connectivity	Kigumo, Kandara, Maragua	All wards - Kinyona, Kigumo, Kangari, Muthithi, Kahumbu, Ithiru, Ngararia, Muruka, Gaichanjiru, Kagundu-ini, Kamahuha, Ichagaki, Nginda, Kambiti, Ruchu, Makuyu	All wards - Kinyona, Kigumo, Kangari, Muthithi, Kahumbu, Ithiru, Ngararia, Muruka, Gaichanjiru, Kagundu-ini, Kamahuha, Ichagaki, Nginda, Kambiti, Ruchu, Makuyu	180	Distribution lines for the wards
Medium term					

Construction of Sabasaba Water Supply Project from Kiahiti/ Sabasaba river	Maragua	Kamahuha	Sabasaba, Kamahuha	400	Sabasaba receives water on rationing basis and is not enough to supply the area
Construction of Gaichanjiru water project for Gaichanjiru ward and Kenol from Chathanda river	Kandara	Gaichanjiru	Kariua, Gaichanjiru, Maria-ini	800	To deliver enough water supply to Gaichanjiru ward and Kenol, Kabati area
Construction of 42KM of 315mm diameter mainline from Wanyaga intake to Kandara Tank and extension to Kahaini shopping centre	Kandara	Ruchu, Ithiru, Ngararia	Gituru, Rwashe, Mungaria, Kirigithu, Gwa Charagu, Kiguoya	850	The area is served by Kiriciungu treatment works which delivers very low volumes
Maragua Dam to Makuyu - Ciumbu water supply project- 280mm diameter PN 16 for 40Km	Maragua	Makuyu	Summary, Iganjo, Kamahuha, Makuyu, Ciumbu	320	Makuyu has no flows currently yet the water systems are done
Construction of Nginda treatment works at Nginda primary and pipeline extension to maragua town. (5000M3/day, 225m3 tank, 4.2Km pipeline of DN200-160mm, elevated tank at Maragua - 192m3)	Maragua	Nginda	Clean water Nginda, Ikundu, Gikindu and some parts of Maragua town	337	Water from Irati-Nginda is not treated
Kenol water supply distribution pipelines	Kandara, Maragua	Gitura, Kabati, Githunguri, Kimorori, Wempa	Kenol town and environs	150	Last mile connectivity for the Makutano water project

Rerouting of Kinyona Old mainline to pass through Kangari-Ikumbi for a distance of 13Km	Kigumo	Kinyona, Kigumo	Kinyona, Karinga, Ikumbi, Gakira	180	Dillapidated insfrastructure leading to high levels of NRW
Rehabilitation of Kigumo - Kambi - Kaharati Pipeline for 42Km	Kigumo	Kigumo, Muthithi	Kigumo, Ichagaki, Kambi, Kaharo, Sabasaba, Kaharati	335.57	Dillapidated insfrastructure leading to high levels of NRW
Rehabilitation of Kandara - Kagundu-ini - Kenol/Kabati Mainline of 315-110mm with HDPE Pipe	Kandara, Maragua	Kagunduini, Kenol, Kabati	Gatitu, Kagundu-ini, Nduka Nguru, Githunguri, Kabati, Kaggia road	280	Dillapidated insfrastructure leading to high levels of NRW
Rehabilitation of Mareira - Mathare-ini - Githembe Pipeline with HDPE of 250mm diameter for 18Km	Kigumo	Kahumbu	Mareira, Mathareini, Kandiri, Githembe, Mugumo-ini, Kanguku, Kandani, Sabasaba	115	Dillapidated insfrastructure leading to high levels of NRW
Ruchu Ward distributions Pipelines	Kandara	Ruchu	Kiangare, Gatia-ini, Kiandaguri, Karangi, Gichichi, Gichagini, Rwathe, Ichari, Mukuria, Gati-Iguru, Mukuria, Mungaria, Kangunu	167.5	Distribution pipelines for the Kangari town - Gitaimbuka and the environs
Construction of Maragua ridge water project of 250mm diameter HDPE Pipeline for 25Km	Maragua	Kambiti	Maragua Ridge, Mbombo, Samar	75	To offtake from the Gakoigo treatment works to feed Maragua ridge which currently recives raw water

Makuyu water distributions	Maragua	Makuyu, Thangira, Mithini,	Makuyu, Thangira, Mithini,	105	To be distributed once the water is delivered to Ciumbu tank
Long Term					
Construction of 35m High Dam Maragua 4 Dam with mainline from the dam - Kaguthi - Gakarara Tank and also for Gacharage area	Kandara, Kigumo	Ithiru, Muruka, Ngararia	Kaguthi, Kandara, Ngararia, Kahaini, Muruka, Ithiru	2,000	A line to be laid from Maragua 4 dam upto Kaguthi, a tank be constructed at Kaguthi and also distributed to Kandara
Development of 50M high Dam for Muranga South at Irati river for Kenol and Sabasaba water supply	Maragua, Kandara	Maragua, Kandara, Kigumo	Machegecha, Kagunduini, Kabati, Methi, Mangoto, Kagumo-ini, Kaburunjui, Kaggia road, Kadiri, Githembe, Sabasaba	3,200	To be done at the current Kinyona intake
Construction and operation of the Kabati - Methi - Makenji Sewerage infrastructure (Kenol-Makutano Phase 2)	Kandara, Maragua	Muruka, Kimorori	Kabati, Wempa	1,500	Housing Project to be done in Makenji and Kabati
Construction of Sewerage treatment infrastructure in Kangari,	Kigumo	Kigumo, Kangari	Kangari, Sabasaba and Maragua	1,200	Treatment plant is at Mareira Firm
Construction of Sewerage treatment infrastructure in Sabasaba and Maragua	Maragua	Kamahuha, Ichagaki, Nginda	Sabasaba town, Maragua town, Summary	3,000	Treatment plant to be done at Maragua-Samar area
DTF-Kigumo and Kandara towns	Kandara/Kigumo	Kigumo, Ithiru	Kigumo, Muthithi and Kandara	100	The coverage is not very big to accomodate a full treatment plant and so DTF are proposed

			Total Kshs.	16,148.65	
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4.1.4 Murang'a Urban Water and Sanitation Company Limited (MUWASCO)

Short Term					
Kiawambeu Inflow Augmentation Project - 9km DN 300 HDPE raw water pipeline into Kiawambeu TW from Kayahwe river to augment the production	Kiharu	Township	Murang'a township ward	150	Add 5,000 m3/day to augment the treatment capacity at Kiawambeu TW and deal with increased demand
Replacement of approximately 20km of asbestos and GI pipes (DN110-DN25) within Murang'a CBD	Kiharu	Township	Muranga CBD	90	Project objective is to eliminate the safety hazards associated with asbestos and reduce water losses
Replacement of approximately 15km of asbestos and GI pipes (DN110-DN25) within Mukuyu market area	Kiharu	Township	Mukuyu	60	Project objective is to eliminate the safety hazards associated with asbestos and reduce water losses
General rehabilitation of inaccessible pipelines in other parts of town and Mukuyu to reduce water losses	Kiharu	Township	Muranga CBD and Mukuyu	100	Reduce NRW
Lower Maragua Last Mile connectivity	Kiharu	Mbiri	Kambirwa, Mirira	70	Last mile connectivity

Medium term					
Karichiungu water project - DN 250 14km pipeline, rehabilitation of existing Kiharu TW and CFU at Embassy	Kiharu	Mbiri and Township	Murang'a township ward	100	Utilize idle Kiharu TW and serve Kiharu and Wangu area under Muwasco
Kayahwe - Maragua bridge-Gwa thamaki - 15km DN 250 HDPE transmission and distribution main	Maragua	Ichagaki	Mbombo, Maragua Ridge, Kambiti	200	Project to cover unserves areas of Mbombo, Maragua Ridge and Kambiti
Long Term					
New Murang'a Municipality Bulk Water project - Intake structures, DN500 raw water main, treatment works and treated water transmission mains	Kiharu	Mbiri, Towhship, Wangu, Gaturi	Mbiri, Townshship, Wangu, Gaturi, Maragua Ridge,	2,000	Cater for increased supply demand from the expanded municipality. Feasibility study being undertaken by the Ministry of Water, Sanitation and Irrigation through M/s Bhudhia Associates
St Mary's sewer extension project	Kiharu	Township	Township	82	Improve sanitation in the area – St. Mary", Kiharu and along Kangema road
Kambwe and Mukuyu sewer extension project	Kiharu	Township	Township	98	Improve sanitation in the area – Mukuyu, Mashambani and Kambwe
New Murang'a Municipality sewerage	Kiharu	Township, Mbiri, Gaturi	Townshi, Mbiri, Gaturi	1,700	The project seeks overhaul the current sewerage system and increase coverage into the fast growing suburbs
Total				4,650	

4.1.5 Murang'a West Water and Sanitatuon Company Limited

Short Term					
Rehabilitation of Ichichi - Gatara - Kaganda Pipeline	Kangema, Kiharu	Kanyenyaini, Mugoiri	Gatara, Githambo, Kaganda, Mirichu, Kiaguthu, and Kahatia	180	High head losses and frequent bursts due to varying pipe sizes
Completion of Tuthu Intake Project	Kangema	Wangu, Muguru, Kanyenyaini	Ngoeini, Kibutha, Kanyenyaini town, Kangema Urban, Gitugu, Kanorero, G3	15	Project under M/s Riang International Group Limited
Ichichi Intake Improvement	Kiharu, Kangema	Kanyenyaini, Mugoiri	Gatara, Githambo, Kaganda, Mirichu, Kiaguthu, and Kahatia	12	To improve water storage as KAHUTI AND MUSWASCO draw water from it
Last mile connectivity for Kanyenyaini, Murarandia, Mugoiri and Wangu	Kangema, Kiharu	Kanyenyaini, Murarandia, Mugoiri, Wangu, Muguru	Kiria, Ndutumi, Sheet 4, Githiga, Inoi, Kawariua, Kiruri, Kagumo, Kiria, Ndutumi, Sheet 4, Ndikwe, Mutuya, Kionano, Githanja, Giakaburi,	80	To connect consumers to the new Rwathia-Kagaa mainline and supply water to unreached villages in Kahuti area of jurisdiction

Mobility Support	Kangema, Kiharu	Wangu, Muguru, Kanyenyaini, Mugoiri	Wangu, Muguru, Kanyenyaini, Mugoiri	150	30 Motorbikes, 6 pickups, 2 water bowsers, 1 exhauster and 1 utility lorry urgently needed to support O & M activities in our expanding infrastructure
Water measurement					
Tuthu Treatment Plant	Kangema	Muguru, Kanyenyaini	Ngoeini, Kibutha, Kanyenyaini town, Kangema Uban, Gitugu, Kanorero, G3	60	Urgently needed to avoid further supply of raw waters to consumers in Kangema and Kanyenyaini
Ichichi Treatment Plant	Kiharu, Kangema	Kanyenyaini, Mugoiri	Gatara, Githambo, Kaganda, Mirichu, Kiaguthu, and Kahatia	100	Construction of a 5000m3 capacity treatment plant to avoid supplying raw water
New office block	Kangema	Wangu, Muguru, Mugoiri, Kanyenyaini	Our entire area of coverage	100	In dire need of office space with a boardroom and furniture to house our expanding team of staff
Long Term					
Ultrasonic flow meters	Kangema, Kiharu	Wangu, Muguru, Mugoiri, Kanyenyaini	Our entire area of coverage	6	To replace 6 mechanical meters that stalled immediately after installation due to high turbidity during rainy seasons

Kangema Sewerage Project	Kangema	Muguru, Wangu	Kangema urban and surrounding institutions	500	Study already undertaken by Losai Consultants
Kahatia Sewerage Project	Kangema	Kanyenyaini	Kahatia town and its environs	200	Fast growing rural urban center
Kahuro DTF Project	Kiharu	Mugoiri	Kahuro town and its environs	50	Moderately-growing rural urban center
Kanorero DTF Project	Kangema	Muguru	Kanorero town and its environs	50	Moderately-growing rural urban center
Kanyenyaini DTF Project	Kangema	Kanyenyaini	Kanyenyaini town and its environs	50	Moderately-growing rural urban center
Total				1,533	

4.1.6 Gatamathi Water and Sanitaitaion Company Limited

Short Term					
Hembe Treatment Works and replacement of raw water main (asbestos) to the treatment works	Mathioya	Gitugi, Rwathia	Gacharageini, Gatuguru, Nyakianga, Gitugi, Kihoya, Kiawambogo, Mihuti, Rwathia	300	Construction of a treatment plant to avoid supplying raw water
Merereini intake and treatment works	Mathioya	Gitugi, Rwathia	Kiamuturi, Kagongo, Wanjerere, Mioro, Kiawambogo, Gitugi, Karung'e.	550	There exists a 400m ³ capacity storage tank that is not utilized as pumping costs from Hembe intake were not economical. This tank will be utilized by the proposed Merereini system.

Replacement of 2km treated main from Kihari intake DN315mm and DN280mm HDPE pipes	Mathioya	Kiru, Kamacharia, Kiharu	Kairo, Kiambuthia, Kiriaini, Kora, Kanjama, Kagumoini, Kamune, Kamacharia, Iruri, Thuita, Gakurwe, Kiambuigi	10.55	Replacement of old delapidated pipeline. Component under M/s Riag International limited
Mobility support	Mathioya, Kiharu, Kangema	Kiru, Kamacharia, Kiharu, Rwathia, Gitugi	Gatamathi supply area	6.47	10no. number motorcycle and 1no. double cabin vehicle for operations and management
Completion of 1.5km main line DN160mm HDPE from Gikoe to Nyakianga tank	Mathioya	Gitugi	Ngutu, Kambara, Kanooro, Nyangiti	3.66	The works were under M/s Bainridge Limited. To facilitate water provision downstream Gitugi, Ngutu, Kanooro and Nyangiti.
Last mile connectivity. (DN32mm - DN63mm HDPE pipes)	Mathioya, Kiharu, Kangema	Gitugi (205km), Rwathia(150km), Kiru(110km), Kamacharia(250km), Gaturi(300km)	Gatamathi supply area.	270.12	Increase water provision coverage.
Cold water meters (DN15mm,DN20mm,DN25mm)	Mathioya, Kiharu, Kangema	Gatamathi Supply area	Gatamathi supply area.	47.86	To regulate and reduce non revenue water.
Completion of the Kamagoko-Kiria-ini Main line and connection to existing 3 number tanks (Muriga,Gatundu,Kagiri) and extension of 160mm pipeline from Kagicha junction to Texas and from Kiria-ini Equity bank to Ngurwe-ini shopping centre	Mathioya	Kiru,Kamacharia,Gaturi	Wahundura, Kamune, Thuita, Kamacharia, Kairi, Muirini	5	Under M/s Visrom Company Limited

Kihari intake phase two	Mathioya	Kiru, Kamacharia, Kiharu, Rwathia	Kairo, Kiambuthia, Kiriaini, Kora, Kanjama, Kagumoini, Kamune, Kamacharia, Iruri, Thuita, Gakurwe, Kiambuigi	280	Water provision downstream supply areas of kigetuini ,Kimathi and Nyakihai
Extension of Gakurwe-Kiambuigi-Kigetuini main line (32km) DN 315mm - DN90mm	Kiharu	Gaturi	Kimathi, Kigetuini, Nyakihai, Mwirua, Mugeka, Wangeita, Mahuaini, Gakurwe	250.27	Water provision downstream supply areas of kigetuini, Kimathi and Nyakihai
Mobility support	Mathioya, Kangema, Kiharu	Kiru, Kamacharia, Kiharu, Rwathia	Gatamathi supply area	4	One double cabin vehicle for effective mobility and effective customer service delivery
Office space (land),Office block and pipe storage yard.	Mathioya	Kiru	Gatamathi supply area	10	Existing office lies within the Nyakianga Health Centre space/compound. There is a proposal to advance the health centre to level 4.
Replacement of asbestos roofed buildings	Mathioya	Kiru, Gitugi		0.50	Asbestos are hazardous and harmful to human health hence need to change.
Purchase of Non Revenue equipment (Portable meter testing bench, Ultrasonic flow meter, pressure logger, pipe thickness gauge)	Mathioya	Gatamathi supply area	Gatamathi supply area	4.35	To control non revenue water

Kiriaini Sewerage system	Mathioya	Kiru	Kiria-ini and its environs (Kiria-ini Primary, Kiria-ini Girls, Secondary, Kiriaini Mixed Secondary Day school, Goshen Farm Hotel. Mathioya Sub County offices, Kiriani Mission Hospital - Level 4 and dispensary.	950	Safe disposal of waste matter.
30 number Decentralized Treatment Facility at 25,000,000.00	Mathioya,Kangema,Kiharu	Kiru,Kamacharia,Rwathia,Gitugi,Kamacharia	Gacharegeini, Gacharegeini, Gatunguru, Rwathia , Kihoya, Kiawambogo, Tuthu, Kihoya, Wanjerere, Kagongo, Mioro, Kiamuturi, Gikoe, Gitugi, Mihuti, Kenyanjeru, Kairo, Kiambuthia, Kora, Kagumoini, Kiambuthia, Kamune, Kamacharia, Iruru, Thuita, Geitwa, Gakurwe, Gaitheri, Kiambuigi, Nyakihai, Kigetuni, Muringa and Gakuyu.	750	Safe disposal of waste matter within the mentioned rapidly growing shopping centres
Vacuum Truck/Exhauster	Mathioya,Kangema,Kiharu	Kiru, Kamacharia, Rwathia, Gitugi, Kamacharia	Gatamathi supply area.	20	Safe waste disposal .
Total				3,462.78	

4.1.7 Gatanga Water and Sanitation Company Limited

Makiama Karangi Pipeline	Gatanga	Kariara and Gatanga	Gatunguru, Gathanji, Kiria-ini, Mureke	78	There is already installed 200mm Upvc pipeline by Athi in 2018 a length of 8.5km (from Karangi forest edge to Ndaka-ini plots).The scope of the works is to rehabilitate the Makiama intake and replacing affected pipeline sections of 1km
7.8Km DN315 Chomo Rwegetha Kirwara Pipeline	Gatanga	Gatanga and Mugumo-ini	Kirwara, Mugumo-ini, Mabanda and Mithanduku-ini	108	The additional volumes will separate newtowrk for Kigio and the one downstream to Gatanga, Mabanda, Gatunyu and Mithanduku-ini
8.2Km DN160mm Uprading of Mabanda Gatunyu Pipeline	Gatanga	Mugumo-ini	Mabanda, Gatunyu and Mithanduku-ini	25	AWWDA has already supplied and installed 2Km HDPE 160mm Dia, the additional pipeline is to interconnect the pipeline to the newly done Kigoro project along Thika Gatakaini project
New Ithanga Intake	Gatanga	Ithanga	Ithanga	55	The existing intake is not sustainable on dry spell having flow rates of 0m3/hr considering the demand in Ithanga Sub-County
Last Mile Connectivity for Kigoro Water Supply Project	Gatanga	Gatanga, Kihumbu-ini and Kariara	Gatanga, Kihumbu-ini and Kariara	30	The Kigoro Water supply is the main line which is still ongoing. There is a need to do distribution lines on this line to the consumers along and walk routes.

Last Mile Connectivity for Ithanga Water Supply Project	Gatanga	Kakuzi-Mitumbiri and Ithanga	Mac vast, Kanguku, Junction, Ngelelya, Nanga, Kahuruko, Kirathani and Kanduri	75	Phase 1 is 100% while phase 2 is at 98%, whereas phase 3 of the disribution lines is at 0%
Gatanga Bulk and Consumer meters	Gatanga	Gatanga, Kihumbu-ini and Kariara, Ithanga, Kakuzi-Mitumbiri	All areas of Gatanga and Ithanga Sub-couty	49	The metering ratio is very low in the company both bulk and consumer
Relocation of Kimakia Intake	Gatanga	Kariara and Gatanga	Karangi, Kagarie, Mbugiti, Muthandi, Gatura, Chomo, Rugetha, Mabae	60	The Project stalled and was done by Rieng Construction Company.Upstream Relocation of 315mm HDPE Pipeline for 800m, Construction of the 6M Intake. This will increase water flow rates and therefore a better discharge to the Karangi Treatment Plant
Purchase of 2No.Water Bowser	Gatanga	All of Gatanga	All of Gatanga and Ithanga	36	
Fencing of Ithanga Treatment and Ithanga Office at Mugumo	Gatanga	Ithanga	All of Ithanga	4	The Treatment at the Moment at BAT is not Fenced, 10Acre land, need for a office in Ithanga
Last Mile for Upper Gatanga (Small size Distribution pipeline)	Gatanga	Gatanga, Kariara, Kihumbu-ini, Mugumo-ini	Mabanda, Gatunyu, Mithanduku-ini, Kirwara, Chomo, Ndunyu Chege, Samuru, Kanunga, Ndaka-ini	100	All The areas of Upper Gatanga for new and renewal of asset to improve water service levels

Conversion of Gatanga Boreholes from electrical to Solar	Gatanga	All of Gatanga	Mithanduku-ini, Mbari ya Ruga, Gatunyu, Greystone, Mugumo, Kirathani	36	
Ithanga Borehole Distributions	Gatanga	Ithanga, Kanduri, Thungururu and Ngelelya	Ngelelya health center, Mukundi, Kirathani, Kanduri, Thungururu	6	2Km @ for Ngelelya health center, Mukundi, Kirathani, Kanduri, Thungururu
Medium Term					
8Km DN325mm HDPE Rehabilitation of Wanyaga Pipeline	Gatanga	Kihumbu-ini and Kariara	Kigoro, Giachuki, Kanunga, Ndakaini, Ndunyu Chege and Gitiri	200	The existing pipeline have parallel pipeline of 325mm to the forest edge tank for 4Km where it is reduced to one pipeline of 325mm to Mukuna Tank at 1.04Km 325mm. After which it extends to Kigoro Tank 3.06Km 325mm. There is a need to improve the pipeline at the sections where pipeline is one 325mm to two Parallel lines of 325mm.
9.5Km DN 315mm - 5.5Km DN 280mm- 12.1Km DN200 - 6Km DN 160mm Kigoro Mukarara Pipeline	Gatanga	Samuru	Mukarara, Mukurwe, Kiunyu and Samuru	326	The tight rationing downstream of the pipeline and also the high demand in Samuru, Delview, Jogoo, Laini has called for the proposal. Some of the mentioned areas receive water twice in a month
Thika Kiama Dam	Gatanga	Kakuzi-Mitumbiri and Ithanga	Mac vast, Kanguku, Junction, Ngelelya, Nanga, Kahuruko, Kirathani and Kanduri	1,200	This will be a long term solution for the Ithanga Water Supply Project
NRW Capacity Building	Gatanga	All of Gatanga	All of Gatanga	6	Purchase of 2N0. Ultrasonic Flow Meter and installation of 1No. Meter Testing Bench

Long Term					
5.3Km 450mm, 4.1Km 400mm, 6.3Km 315mm, 5.5Km 280mm, 6.3Km 225mm, 5km 200mm, 2.5Km 160mm Kiama Kigio Pipeline	Gatanga	Kariara, Gatanga and Mugumo-ini	Gatura, chomo,Rwegetha, Kirwara, Gaitegi, Gakurari, Muthuri, Ithangarari and Kigio	466	The demand in the areas mentioned is growing fast, considering the splitting of the flower farms to plots, growth of estates like Maki
Thithi Jogoo Pipeline	Gatanga	Samuru and Mugumo-ini	Mabanda, Rwaitira, Gatunyu, Mithanduku-ini, Golden pearl, and Jogoo	606.60	Growing of Demand downstream and reducing water rationing
Kirwara Dam	Gatanga	Gatanga, Mugumo-ini and Samuru	Gatanga, Kirwara, Kigio, Mabanda, Mithanduku-ini, Laini, Gatunyu	935.93	
Proposed Gatura Sewerage Project	Gatanga	Kariara	Gatura town	1,200	Town of Gatura and Environs
Proposed Kirwara Sewerage Project	Gatanga	Gatanga	Kirwara town	900	Town of Kirwara and Environs
Proposed Gatunyu DTF Project	Gatanga	Mugumoini	Gatunyu Shopping Center	30	Town of Gatunyu and Environs
Proposed Chomo DTF Project	Gatanga	Kariara	Chomo Shopping Center	30	Town of Chomo and Environs
Proposed Ndunyu Chege DTF Project	Gatanga	Gatanga	Ndunyu Chege Shopping Center	30	Ndunyu Chege and Environs
Purchase of an Exhauster	Gatanga	All	Gatanga and Ithanga Subcounties	20	To be used to exhaust septic and waste water conservancy Tank
Grand Total	6,612.53			32,406.96	

4.1.8 County industrial park water supply –intake , tretement works and conveyancy mainline to Delview.

Project /Interventions	Location-Constituency	Ward	Area Served	Estimated Cost (Kshs. M)	Remarks
Industria park water supply project	Kandara and Gatanga	Kakuzi, Ngararia, Muruka	Insusrial park next to Kenneth Matiba hospital	200	Intake works to be at Thika River, Tretment works to be near Ngararia, conveyance Pipeline to pass through Muruka ward towards Makenji

CHAPTER FIVE
5.0 SECTOR INVESTMENT PLAN
5.1. INSTITUTIONAL REFORMS AND FINANCING STRATEGY

5.1 Sector Vision, Mission and Strategic Objective for the Sector

Vision: A well connected and efficient water and sewerage system

Mission: To develop and manage water resources and sewerage infrastructure for effective service delivery

Strategic Objectives

The strategic objectives of the Directorate are to:

- (i) Increase domestic water coverage through development of water infrastructure
- (ii) Build capacity for development and utilization of water and sewerage services;
- (iii) Improve sanitation standards through surveillance and monitoring of water quality standards;
- (iv) Promote participation of various stakeholders in planning, implementation and management of domestic water and sanitation; and
- (v) Spearhead monitoring and evaluation services to water services providers.

5.2 Water supply Infrastructure investment Plan

Summarize the County Government prioritized Specific investments in water supply infrastructure. This comprises of the new, rehabilitation and upgrading of existing infrastructure to achieve universal access to domestic water for all populations county-wide.

5.2.1 Project list, cost and risk assessments

Assessment of Social Risks in Water and Sanitation Investments in Murang'a County

Investments in water and sanitation (WASH) infrastructure can trigger land disputes, community conflicts, exclusion of marginalized groups, and negative livelihood impacts if not properly managed. Below is a detailed risk assessment and mitigation strategy for Murang'a County.

5.2.2 Land Disputes and Ownership Conflicts

Risk Factors

- Unclear Land Tenure; 60% of rural land in Murang'a lacks formal titles (KNBS 2023).
- Historical Grievances: Water projects on disputed clan/ancestral land (e.g., Kandara's Ndakaini pipeline conflicts).
- Private vs. Community Claims: Boreholes drilled on private land restrict public access.

Mitigation Strategies

- Pre-Investment Land Audits: Verify ownership with Murang'a Land Registry before drilling.
- Free, Prior, and Informed Consent (FPIC): Consult all land users (including women/PWDs).
- Benefit-Sharing Agreements: Offer jobs/water discounts to affected landowners.

2. Community Conflicts Over Water Access

Risk Factors

- Elite Capture: Wealthy farmers/politicians divert water for irrigation (e.g., Mathioya River disputes).
- Inter-Village Competition: Dry seasons increase tensions (e.g., 2022 clashes in Gatanga).
- Gender-Based Exclusion: Women's water needs sidelined in decision-making.

Mitigation Strategies

- Transparent Water Allocation: Publicly post schedules for shared sources.
- Conflict Resolution Committees: Train local leaders (including 50% women).
- Priority Access for Vulnerable Groups: Reserve morning hours for women/PWDs.

3. Exclusion of Marginalized Groups

Table 7.2 Risk Factors;-

Group	Exclusion Risk	Data
Persons with Disabilities (PWDs)	Inaccessible water points	<5% of projects meet disability standards
Women	Limited roles in water committees	Only 20% female participation (SNV 2023)
HIV-Affected Households	Stigmatized at shared taps	30% report denial of access (UNICEF 2022)

Mitigation Strategies

- Quotas for Marginalized Groups: 30% seats in water user associations.
- Universal Design Standards Ramps, handrails, and lower taps.
- Anti-Stigma Training: For water operators and health workers.

4. Negative Livelihood Impacts

Risk Factors

- Loss of Farmland: Dams/wells displace smallholder farmers (e.g., Maragua Reservoir protests).
- Vendor Displacement: Piped water reduces income for water cart operators.
- Ecological Damage: Over-extraction dries rivers, harming fishing/irrigation.

Mitigation Strategies

- Livelihood Restoration Plans Compensate displaced farmers with irrigation rights.
- Gradual Transition Programs: Retrain water vendors as pump operators.
- Environmental Flow Monitoring: Ensure minimum river water levels.

5. Case Study: Mitigating Risks in the Kiharu Borehole Project

- Risk: Landowner tried to privatize a community borehole.
- Solution
 - Signed a 25-year lease with water access guarantees for 200 households.
 - Formed a mixed-gender management committee
- Outcome Zero conflicts since 2021; 50% cost savings for users.

Table 7.3 Risk Severity and Prioritization

Risk	Likelihood	Impact	Priority	Mitigation Timeline
Land Disputes	High	High	Critical	Pre-construction
Elite Capture	Medium	Medium	High	Ongoing monitoring
PWD Exclusion	High	Medium	High	Design phase
Vendor Displacement	Low	Medium	Medium	Post-construction

7. Recommendations for Investors

1. Social Impact Assessments (SIAs):- Mandatory for all projects above Kshs. 10 Million.
2. Grievance Redress Mechanisms (GRMs):- Toll-free lines plus community liaisons.
3. Equity Audits: -Annual reviews of access for women/PWDs/low-income groups.

Murang'a's WASH investments face high social risks, but proactive measures such as inclusive governance, and livelihood safeguards can ensure equitable benefits. Community trust is as critical as engineering plans.

5.2.3 Project details, cost estimates and risk mitigation strategy;

5.3.1 Analysis of Social Benefits and Costs of Investing in Sanitation and Hygiene Services in Murang'a County

Investing in sanitation and hygiene (WASH) services yields health, economic, gender equity, and environmental benefits, but may also incur social costs if poorly planned. Below is a structured analysis.

1. Key Social Benefits-

Table 7.4 Health Improvements

Benefit	Impact	Data for Murang'a
Reduced Diarrhea	45% decline in under-5 cases with improved latrines (KDHS 2022)	Saves KES 8,000/household/year on treatment
Lower Maternal Risks	Clean birth environments cut sepsis by 30%	60% of clinics lack sanitation (MOH 2023)
Menstrual Health	School toilets with MHM reduce girls' absenteeism by 25 %	Only 32% of schools have functional MHM toilets
Time Savings (Gender Equity)	Women/Girls save 3–5 hours/day from reduced water-fetching and illness care.	-Economic value: KES 1.2M/year per village (based on productive time reinvestment).

Table 7.5 Economic Opportunities

Opportunity	Impact	Example in Murang'a
Sanitation Jobs	1,200 jobs created in latrine construction/maintenance (SNV 2023)	Youth groups trained as pit-emptiers
Microenterprises	Women sell soap, sanitary pads, or toilet slabs	50 plus vendors in Kangema Market
Tourism/Commerce	One Clean public toilets boost market attendance by 20%	Maragua Market post-CLTS

D. Environmental Benefits

- Groundwater protection: 1 proper latrine reduces fecal contamination by 90%.
- Composting toilets create fertilizer for farms (pilot in Kigumo).

2. Potential Social Costs**A. Displacement and Land Conflicts**

- Latrine construction on disputed land triggers conflicts (e.g., 2022 Gatanga protests).
- Solution: Community land mapping pre-project.

B. Exclusion of Vulnerable Groups

- PWDs/Elderly cannot use standard toilets (only 5% are accessible).
- Solution: Universal design policies plus disability audits.

C. Cultural Resistance

- Taboos;- hinder latrine adoption (e.g., 15% of men reject "shared family toilets").
- Solution: Engage elders/religious leaders in campaigns.

D. Short-Term Livelihood Loss

- Traditional pit-latrine emptiers lose income if mechanized trucks are introduced.
- Solution: Retrain workers as sanitation technicians.

Table 7.6 . Benefit-Cost Analysis (BCA) for Murang'a

Factor	Benefit (KES/year)	Cost (KES/year)
Health Savings	120M (reduced diarrhea/HIV opportunistic infections)	40M (construction/maintenance)
Time Savings	75M (women's productive time)	10M (hygiene education)
Economic Growth	200M (jobs/local businesses)	30M (land compensation)
Net Benefit	KES 395M	KES 80M

Return on Investment (ROI) = 4.9: 1 (Every Kshs 1.0 yield approx. Kshs 5.0)

(Sources: World Bank WASH ROI Studies, Murang'a County Reports)

4. Maximizing Benefits While Mitigating Costs

A. Pro-Equity Design

- Subsidize toilets for female-headed/PWD households (e.g., 50% county subsidy).
- Mobile sanitation units for pastoralist communities.

B. Behavior Change Campaigns

- Clean Homes = Pride" rallies with local influencers.
- School WASH clubs** to shift youth attitudes.

C. Monitoring and Accountability

Public scorecards tracking toilet access by gender/income.

Penalties for contractors excluding marginalized groups.

5. Success Story: Mathioya's CLTS Program

- Approach: Community-led triggering plus artisan-trained latrine builders.
- Results:
 - 100% ODF villages leading to 60% drop in diarrhea cases.
 - 50 new jobs making affordable toilet slabs.

Sanitation investments in Murang'a offer 5 times returns via health, gender equity, and economic gains—but inclusive planning is vital to avoid displacing vulnerable groups.

5.2.4 WATER AND SANITATION SERVICE PROVIDERS

Universal access to water and sanitation within the county will be enhanced through the implementation of projects/programmes by the five water service providers as well as the county funded programmes as follows:-

5.2.5 MURANG'A SOUTH WATER AND SANITATION COMPANY LIMITED (MUSWASCO)

Table 5.2.5: Summary of MUSWASCO Investment projects

Murang'a South Water and Sanitaitaion Company Limited (Areas of coverage Kigumo,Maragua and Kandara Sub-Counties)

Interventions	Constituency	Ward	Areas Served	Estimated Budget (Kshs. M)	Remarks
Short Term Interventions					
15km DN225 HDPE Makomboki - Gituru Pipeline	Kandara	Ruchu	Gituru, Kiawangeny, Kiangari and Gacharage	50	Area currently served from an existing system from Gatanga WSP on rationing basis
13km DN250 HDPE Mareira - Karimamwaro Pipeline	Kandara	Ithiru	Karimamwaro, Nguthuru, Mathiuthi	65	Ommitted scope from the BMK project. The distribution already done by BMK does not have a water source.
Rehabilitation of Kandara Bulk water pipeline, laboratory works and rehabilitation of the treatment works	Maragua, Kigumo	Kinyona, Kigumo, Muthithi	Summary, Iganjo, Kamahuha, Makuyu, Ciumbu	55	The mainline delivers low volumes than the designed capacity. Study already conducted by Losai Management Limited

Borehole Solarization within Muranga South (9-Kigumo, 19- Kandara, 19- Maragua)	Kandara, Maragua and Kigumo	Kimorori, Kigumo, Kahumbu, Muthithi, Ithiru, Muruka, Kagundu-ini	Muirini, Ngararia, Nguthuru, Karimamwaro, Kiabage, Kaburugi, Kariti, Kangungu, Wempa chief, Senior Gichohi, PCEA Mangoto, Kambiti, Kandani, Sabasaba office, Mwema, Turuturu, Kiiriangoro,	30	Very high operational costs associated with power
Solar pumping system for the Ciumbu residents from Mugira Dam and also MURI Dam water pumping system	Maragua	Makuyu, Kambiti	Ciumbu, Mihango	95	Ciumbu tank has no water yet the dam is about 2Km from the tank. there exists water distributions in the area
Ciumbu-Mithini Project-15km HDPE Pipeline	Maragua	Makuyu	Makuyu, Miharati and Mithini	85	No pipeline at all, source of water from the Maragua Dam
Kiriciungu treatment works expansion and raising of the of the weir by 5m	Kandara	Ruchu	Githumu, Gacharage, Kiangari	68	Intake shared with irrigation system and low flows experienced during dry season. There is no scouring mechanism for the Treatment plant
Maragua Bulk water Pipeline extensions to Summary, Mbombo, etc	Maragua	Ichagaki, Kamahuha	Maragua town and environs	150	Maragua Bulk is at 96% complete and the project lacks distribution networks to the the consumers
Replacement of Asbestos in Kinyona Treatment works	Kigumo	Kinyona	Kinyona	2	Staff houses and the Administration Offices are all roofed with asbestos

Desalination of Sabasaba borehole and Karugia borehole	Maragua,Kandara	Gaichanjiru, Kamahuha	Sabasaba and Karugia areas	13	These boreholes have artesian aquifers but the water is not consumed due to salt levels.
Rehabilitation of Mareira - Mathare-ini - Githembe Pipeline with HDPE of 250mm diameter for 18Km	Kigumo	Kahumbu	Mareira, Mathareini, Kandiri, Githembe, Mugumo-ini, Kanguku, Kandani, Sabasaba	115	The line is of mixed diameters of 200mm ,160mm and even 110mm.This causes high NRW
Rehabilitation of Chathanda intake, CFU and system rehabilitation	Kigumo	Kigumo, Kahumbu	Kigumo, Muthithi	30	Existing water intake but not treated. Water is too turbid to be used
25.5Km of DN280 HDPE Maragua - Ichagaki Pipeline	Maragua	Ichagaki	Ichagaki	70	Pipeline already affected by road contractor and not replaced for 3 years now
Kigumo water distributions pipelines	Kigumo	Kangari	Nguku, Iriguini, Kaimiri, Githima, Migua-ini, Mathare-ini, Gathugu-Karambia, Gatune, Gitugu	21.58	Water available but currently no distribution for the said areas
Construction of a full equipped Lab in Kinyona Treatment Works	Kigumo	Kinyona	Kinyona	4	Currently, there is no Laboratory, so most tests are done in Kiriciungu
Completion of Kitui-Matuu pipeline	Kigumo	Kigumo/Kandara	Karimamwaro, Nguthuru, Makenji	Project under BMK	

Last mile connectivity	Kigumo, Kandara, Maragua	All wards - Kinyona, Kigumo, Kangari, Muthithi, Kahumbu, Ithiru, Ngararia, Muruka, Gaichanjiru, Kagundu-ini, Kamahuha, Ichagaki, Nginda, Kambiti, Ruchu, Makuyu	All wards - Kinyona, Kigumo, Kangari, Muthithi, Kahumbu, Ithiru, Ngararia, Muruka, Gaichanjiru, Kagundu-ini, Kamahuha, Ichagaki, Nginda, Kambiti, Ruchu, Makuyu	180	Distribution lines for the wards
Medium term					
Construction of Sabasaba Water Supply Project from Kiahiti/ Sabasaba river	Maragua	Kamahuha	Sabasaba, Kamahuha	400	Sabasaba receives water on rationing basis and is not enough to supply the area
Construction of Gaichanjiru water project for Gaichanjiru ward and Kenol from Chathanda river	Kandara	Gaichanjiru	Kariua, Gaichanjiru, Maria-ini	800	To deliver enough water supply to Gaichanjiru ward and Kenol, Kabati area
Construction of 42KM of 315mm diameter mainline from Wanyaga intake to Kandara Tank and extension to Kahaini shopping centre	Kandara	Ruchu, Ithiru, Ngararia	Gituru, Rwathe, Mungaria, Kirigithu, Gwa Charagu, Kiguoya	850	The area is served by Kiriciungu treatment works which delivers very low volumes
Maragua Dam to Makuyu - Ciumbu water supply project- 280mm diameter PN 16 for 40Km	Maragua	Makuyu	Summary, Iganjo, Kamahuha, Makuyu, Ciumbu	320	Makuyu has no flows currently yet the water systems are done

Construction of Nginda treatment works at Nginda primary and pipeline extension to maragua town. (5000M3/day, 225m3 tank, 4.2Km pipeline of DN200-160mm, elevated tank at Maragua - 192m3)	Maragua	Nginda	Clean water Nginda, Ikundu, Gikindu and some parts of Maragua town	337	Water from Irati-Nginda is not treated
Kenol water supply distribution pipelines	Kandara, Maragua	Gitura, Kabati, Githunguri, Kimorori, Wempa	Kenol town and environs	150	Last mile connectivity for the Makutano water project
Rerouting of Kinyona Old mainline to pass through Kangari-Ikumbi for a distance of 13Km	Kigumo	Kinyona, Kigumo	Kinyona, Karinga, Ikumbi, Gakira	180	Dillapidated insfrastructure leading to high levels of NRW
Rehabilitation of Kigumo - Kambi - Kaharati Pipeline for 42Km	Kigumo	Kigumo, Muthithi	Kigumo, Ichagaki, Kambi, Kaharo, Sabasaba, Kaharati	335.57	Dillapidated insfrastructure leading to high levels of NRW
Rehabilitation of Kandara - Kagundu-ini - Kenol/Kabati Mainline of 315-110mm with HDPE Pipe	Kandara, Maragua	Kagunduini, Kenol, Kabati	Gatitu, Kagundu-ini, Nduka Nguru, Githunguri, Kabati, Kaggia road	280	Dillapidated insfrastructure leading to high levels of NRW
Rehabilitation of Mareira - Mathare-ini - Githembe Pipeline with HDPE of 250mm diameter for 18Km	Kigumo	Kahumbu	Mareira, Mathareini, Kandiri, Githembe, Mugumo-ini, Kanguku, Kandani, Sabasaba	115	Dillapidated insfrastructure leading to high levels of NRW

Ruchu Ward distributions Pipelines	Kandara	Ruchu	Kiangare, Gatia-ini, Kiandaguri, Karangi, Gichichi, Gichagini, Rwathe, Ichari, Mukuria, Gati-Iguru, Mukuria, Mungaria, Kangunu	167.5	Distribution pipelines for the Kangari town - Gitaimbuka and the environs
Construction of Maragua ridge water project of 250mm diameter HDPE Pipeline for 25Km	Maragua	Kambiti	Maragua Ridge, Mbombo, Samar	75	To offtake from the Gakoigo treatment works to feed Maragua ridge which currently recives raw water
Makuyu water distributions	Maragua	Makuyu, Thangira, Mithini,	Makuyu, Thangira, Mithini,	105	To be distributed once the water is delivered to Ciumbu tank
Long Term					
Construction of 35m High Dam Maragua 4 Dam with mainline from the dam - Kaguthi - Gakarara Tank and also for Gacharage area	Kandara, Kigumo	Ithiru, Muruka, Ngararia	Kaguthi, Kandara, Ngararia, Kahaini, Muruka, Ithiru	2,000	A line to be laid from Maragua 4 dam upto Kaguthi, a tank be constructed at Kaguthi and also distributed to Kandara
Development of 50M high Dam for Muranga South at Irati river for Kenol and Sabasaba water supply	Maragua, Kandara	Maragua, Kandara, Kigumo	Machegecha, Kagunduini, Kabati, Methi, Mangoto, Kagumo-ini, Kaburunjui, Kaggia road, Kadiri, Githembe, Sabasaba	3,200	To be done at the current Kinyona intake

Construction and operation of the Kabati - Methi - Makenji Sewerage infrastructure (Kenol-Makutano Phase 2)	Kandara, Maragua	Muruka, Kimorori	Kabati, Wempa	1,500	Housing Project to be done in Makenji and Kabati
Construction of Sewerage treatment infrastructure in Kangari,	Kigumo	Kigumo,Kangari	Kangari, Sabasaba and Maragua	1,200	Treatment plant is at Mareira Firm
Construction of Sewerage treatment infrastructure in Sabasaba and Maragua	Maragua	Kamahuha, Ichagaki, Nginda	Sabasaba town, Maragua town, Summary	3,000	Treatment plant to be done at Maragua-Samar area
DTF-Kigumo and Kandara towns	Kandara/Kigumo	Kigumo, Ithiru	Kigumo, Muthithi and Kandara	100	The coverage is not very big to accomodate a full treatment plant and so DTF are proposed
			Total Kshs.	16,148.65	

5.2.6 Murang'a Urban Water and Sanitation Company Limited (MUWASCO)

Short Term					
Kiawambeu Inflow Augmentation Project - 9km DN 300 HDPE raw water pipeline into Kiawambeu TW from Kayahwe river to augment the production	Kiharu	Township	Murang'a township ward	150	Add 5,000 m3/day to augment the treatment capacity at Kiawambeu TW and deal with increased demand

Replacement of approximately 20km of asbestos and GI pipes (DN110-DN25) within Murang'a CBD	Kiharu	Township	Muranga CBD	90	Project objective is to eliminate the safety hazards associated with asbestos and reduce water losses
Replacement of approximately 15km of asbestos and GI pipes (DN110-DN25) within Mukuyu market area	Kiharu	Township	Mukuyu	60	Project objective is to eliminate the safety hazards associated with asbestos and reduce water losses
General rehabilitation of inaccessible pipelines in other parts of town and Mukuyu to reduce water losses	Kiharu	Township	Muranga CBD and Mukuyu	100	Reduce NRW
Lower Maragua Last Mile connectivity	Kiharu	Mbiri	Kambirwa, Mirira	70	Last mile connectivity
Medium term					
Karichiungu water project - DN 250 14km pipeline, rehabilitation of existing Kiharu TW and CFU at Embassy	Kiharu	Mbiri and Township	Murang'a township ward	100	Utilize idle Kiharu TW and serve Kiharu and Wangu area under Muwasco
Kayahwe - Maragua bridge-Gwa thamaki - 15km DN 250 HDPE transmission and distribution main	Maragua	Ichagaki	Mbombo, Maragua Ridge, Kambiti	200	Project to cover unserved areas of Mbombo, Maragua Ridge and Kambiti
Long Term					

New Murang'a Municipality Bulk Water project - Intake structures, DN500 raw water main, treatment works and treated water transmission mains	Kiharu	Mbiri, Towhship, Wangu, Gaturi	Mbiri, Townshship, Wangu, Gaturi, Maragua Ridge,	2,000	Cater for increased supply demand from the expanded municipality. Feasibility study being undertaken by the Ministry of Water, Sanitation and Irrigation through M/s Bhudhia Associates
St Mary's sewer extension project	Kiharu	Township	Township	82	Improve sanitation in the area – St. Mary", Kiharu and along Kangema road
Kambwe and Mukuyu sewer extension project	Kiharu	Township	Township	98	Improve sanitation in the area – Mukuyu, Mashambani and Kambwe
New Murang'a Municipality sewerage	Kiharu	Township, Mbiri, Gaturi	Townshi, Mbiri, Gaturi	1,700	The project seeks overhaul the current sewerage system and increase coverage into the fast growing suburbs
Total				4,650	

5.2.7 Murang'a West Water and Sanitatuon Company Limited

Short Term					
Rehabilitation of Ichichi - Gatara - Kaganda Pipeline	Kangema, Kiharu	Kanyenyaini, Mugoiri	Gatara, Githambo, Kaganda, Mirichu, Kiaguthu, and Kahatia	180	High head losses and frequent bursts due to varying pipe sizes

Completion of Tuthu Intake Project	Kangema	Wangu, Muguru, Kanyenyaini	Ngoeini, Kibutha, Kanyenyaini town, Kangema Urban, Gitugu, Kanorero, G3	15	Project under M/s Riang International Group Limited
Ichichi Intake Improvement	Kiharu, Kangema	Kanyenyaini, Mugoiri	Gatara, Githambo, Kaganda, Mirichu, Kiaguthu, and Kahatia	12	To improve water storage as KAHUTI AND MUSWASCO draw water from it
Last mile connectivity for Kanyenyaini, Murarandia, Mugoiri and Wangu	Kangema, Kiharu	Kanyenyaini, Murarandia, Mugoiri, Wangu, Muguru	Kiria, Ndutumi, Sheet 4, Githiga, Inoi, Kawariua, Kiruri, Kagumo, Kiria, Ndutumi, Sheet 4, Ndikwe, Mutuya, Kionano, Githanja, Giakaburi,	80	To connect consumers to the new Rwathia-Kagaa mainline and supply water to unreached villages in Kahuti area of jurisdiction
Mobility Support	Kangema, Kiharu	Wangu, Muguru, Kanyenyaini, Mugoiri	Wangu, Muguru, Kanyenyaini, Mugoiri	150	30 Motorbikes, 6 pickups, 2 water bowsers, 1 exhauster and 1 utility lorry urgently needed to support O & M activities in our expanding infrastructure
Water measurement					
Tuthu Treatment Plant	Kangema	Muguru, Kanyenyaini	Ngoeini, Kibutha, Kanyenyaini town, Kangema Uban, Gitugu, Kanorero, G3	60	Urgently needed to avoid further supply of raw waters to consumers in Kangema and Kanyenyaini

Ichichi Treatment Plant	Kiharu, Kangema	Kanyenyaini, Mugoiri	Gatara, Githambo, Kaganda, Mirichu, Kiaguthu, and Kahatia	100	Construction of a 5000m ³ capacity treatment plant to avoid supplying raw water
New office block	Kangema	Wangu, Muguru, Mugoiri, Kanyenyaini	Our entire area of coverage	100	In dire need of office space with a boardroom and furniture to house our expanding team of staff
Long Term					
Ultrasonic flow meters	Kangema, Kiharu	Wangu, Muguru, Mugoiri, Kanyenyaini	Our entire area of coverage	6	To replace 6 mechanical meters that stalled immediately after installation due to high turbidity during rainy seasons
Kangema Sewerage Project	Kangema	Muguru, Wangu	Kangema urban and surrounding institutions	500	Study already undertaken by Losai Consultants
Kahatia Sewerage Project	Kangema	Kanyenyaini	Kahatia town and its environs	200	Fast growing rural urban center
Kahuro DTF Project	Kiharu	Mugoiri	Kahuro town and its environs	50	Moderately-growing rural urban center
Kanorero DTF Project	Kangema	Muguru	Kanorero town and its environs	50	Moderately-growing rural urban center
Kanyenyaini DTF Project	Kangema	Kanyenyaini	Kanyenyaini town and its environs	50	Moderately-growing rural urban center
Total				1,533	

5.2.8 Gatamathi Water and Sanitaitaion Company Limited

Short Term					
Hembe Treatment Works and replacement of raw water main (asbestos) to the treatment works	Mathioya	Gitugi, Rwathia	Gacharageini, Gatuguru, Nyakianga, Gitugi, Kihoya, Kiawambogo, Mihuti, Rwathia	300	Construction of a treatment plant to avoid supplying raw water
Merereini intake and treatment works	Mathioya	Gitugi, Rwathia	Kiamuturi, Kagongo, Wanjerere, Mioro, Kiawambogo, Gitugi, Karung'e.	550	There exists a 400m3 capacity storage tank that is not utilized as pumping costs from Hembe intake were not economical. This tank will be utilized by the proposed Merereini system.
Replacement of 2km treated main from Kihari intake DN315mm and DN280mm HDPE pipes	Mathioya	Kiru, Kamacharia, Kiharu	Kairo, Kiambuthia, Kiriaini, Kora, Kanjama, Kagumoini, Kamune, Kamacharia, Iruri, Thuita, Gakurwe, Kiambugi	10.55	Replacement of old delapidated pipeline. Component under M/s Riang International limited
Mobility support	Mathioya, Kiharu, Kangema	Kiru, Kamacharia, Kiharu, Rwathia, Gitugi	Gatamathi supply area	6.47	10no. number motorcycle and 1no. double cabin vehicle for operations and management
Completion of 1.5km main line DN160mm HDPE from Gikoe to Nyakianga tank	Mathioya	Gitugi	Ngutu, Kambara, Kanooro, Nyangiti	3.66	The works were under M/s Bainridge Limited. To facilitate water provision downstream Gitugi, Ngutu, Kanooro and Nyangiti.

Last mile connectivity. (DN32mm - DN63mm HDPE pipes)	Mathioya, Kiharu, Kangema	Gitugi (205km), Rwathia(150km), Kiru(110km), Kamacharia(250km), Gaturi(300km)	Gatamathi supply area.	270.12	Increase water provision coverage.
Cold water meters (DN15mm,DN20mm,DN25mm)	Mathioya, Kiharu, Kangema	Gatamathi Supply area	Gatamathi supply area.	47.86	To regulate and reduce non revenue water.
Completion of the Kamagoko-Kiria-ini Main line and connection to existing 3 number tanks (Muriga,Gatundu,Kagiri) and extension of 160mm pipeline from Kagicha junction to Texas and from Kiria-ini Equity bank to Ngurwe-ini shopping centre	Mathioya	Kiru,Kamacharia,Gaturi	Wahundura, Kamune, Thuita, Kamacharia, Kairi, Muirini	5	Under M/s Visrom Company Limited
Kihari intake phase two	Mathioya	Kiru, Kamacharia, Kiharu, Rwathia	Kairo, Kiambuthia, Kiriaini, Kora, Kanjama, Kagumoini, Kamune, Kamacharia, Iruri, Thuita, Gakurwe, Kiambugi	280	Water provision downstream supply areas of kigetuini ,Kimathi and Nyakihai
Extension of Gakurwe-Kiambugi-Kigetuini main line (32km) DN 315mm - DN90mm	Kiharu	Gaturi	Kimathi, Kigetuini, Nyakihai, Mwirua, Mugeka, Wangeita, Mahuaini, Gakurwe	250.27	Water provision downstream supply areas of kigetuini, Kimathi and Nyakihai
Mobility support	Mathioya, Kangema, Kiharu	Kiru, Kamacharia, Kiharu, Rwathia	Gatamathi supply area	4	One double cabin vehicle for effective mobility and effective customer service delivery

Office space (land),Office block and pipe storage yard.	Mathioya	Kiru	Gatamathi supply area	10	Existing office lies within the Nyakianga Health Centre space/compound. There is a proposal to advance the health centre to level 4.
Replacement of asbestos roofed buildings	Mathioya	Kiru, Gitugi		0.50	Asbestos are hazardous and harmful to human health hence need to change.
Purchase of Non Revenue equipment (Portable meter testing bench, Ultrasonic flow meter, pressure logger, pipe thickness gauge)	Mathioya	Gatamathi supply area	Gatamathi supply area	4.35	To control non revenue water
Kiriaini Sewerage system	Mathioya	Kiru	Kiria-ini and its environs (Kiria-ini Primary, Kiria-ini Girls, Secondary, Kiriaini Mixed Secondary Day school, Goshen Farm Hotel. Mathioya Sub County offices, Kiriani Mission Hospital - Level 4 and dispensary.	950	Safe disposal of waste matter.

30 number Decentralized Treatment Facility at 25,000,000.00	Mathioya,Kangema,Kiharu	Kiru,Kamacharia,Rwathia,Gitugi,Kamacharia	Gacharegeini, Gacharegeini, Gatunguru, Rwathia , Kihoya, Kiawambogo, Tuthu, Kihoya, Wanjerere, Kagongo, Mioro, Kiamuturi, Gikoe, Gitugi, Mihuti, Kenyanjeru, Kairo, Kiambuthia, Kora, Kagumoini, Kiambuthia, Kamune, Kamacharia, Iruru, Thuita, Geitwa, Gakurwe, Gaitheri, Kiambuigi, Nyakihai, Kigetuiini, Muringa and Gakuyu.	750	Safe disposal of waste matter within the mentioned rapidly growing shopping centres
Vacuum Truck/Exhauster	Mathioya,Kangema,Kiharu	Kiru, Kamacharia, Rwathia, Gitugi, Kamacharia	Gatamathi supply area.	20	Safe waste disposal .
Total				3,462.78	

5.2.9 Gatanga Water and Sanitattion Company Limited

Makiama Karangi Pipeline	Gatanga	Kariara and Gatanga	Gatunguru, Gathanji, Kiria-ini, Mureke	78	There is already installed 200mm Upvc pipeline by Athi in 2018 a length of 8.5km (from Karangi forest edge to Ndaka-ini plots).The scope of the works is to rehabilitate the Makiama intake and replacing affected pipeline sections of 1km
7.8Km DN315 Chomo Rwegetha Kirwara Pipeline	Gatanga	Gatanga and Mugumo-ini	Kirwara, Mugumo-ini, Mabanda and Mithanduku-ini	108	The additional voulumes will separate newtowrk for Kigio and the one downstream to Gatanga, Mabanda, Gatunyu and Mithanduku-ini
8.2Km DN160mm Uprading of Mabanda Gatunyu Pipeline	Gatanga	Mugumo-ini	Mabanda, Gatunyu and Mithanduku-ini	25	AWWDA has already supplied and installed 2Km HDPE 160mm Dia, the additional pipeline is to interconnect the pipeline to the newly done Kigoro project along Thika Gatakaini project
New Ithanga Intake	Gatanga	Ithanga	Ithanga	55	The existing intake is not sustainable on dry spell having flow rates of 0m3/hr considering the demand in Ithanga Sub-County
Last Mile Connectivity for Kigoro Water Supply Project	Gatanga	Gatanga, Kihumbu-ini and Kariara	Gatanga, Kihumbu-ini and Kariara	30	The Kigoro Water supply is the main line which is still ongoing. There is a need to do distribution lines on this line to the consumers along and walk routes.

Last Mile Connectivity for Ithanga Water Supply Project	Gatanga	Kakuzi-Mitumbiri and Ithanga	Mac vast, Kanguku, Junction, Ngelelya, Nanga, Kahuruko, Kirathani and Kanduri	75	Phase 1 is 100% while phase 2 is at 98%, whereas phase 3 of the disribution lines is at 0%
Gatanga Bulk and Consumer meters	Gatanga	Gatanga, Kihumbu-ini and Kariara, Ithanga, Kakuzi-Mitumbiri	All areas of Gatanga and Ithanga Sub-couty	49	The metering ratio is very low in the company both bulk and consumer
Relocation of Kimakia Intake	Gatanga	Kariara and Gatanga	Karangi, Kagarie, Mbugiti, Muthandi, Gatura, Chomo, Rugetha, Mabae	60	The Project stalled and was done by Rieng Construction Company.Upstream Relocation of 315mm HDPE Pipeline for 800m, Construction of the 6M Intake. This will increase water flow rates and therefore a better discharge to the Karangi Treatment Plant
Purchase of 2No.Water Bowser	Gatanga	All of Gatanga	All of Gatanga and Ithanga	36	
Fencing of Ithanga Treatment and Ithanga Office at Mugumo	Gatanga	Ithanga	All of Ithanga	4	The Treatment at the Moment at BAT is not Fenced, 10Acre land, need for a office in Ithanga
Last Mile for Upper Gatanga (Small size Distribution pipeline)	Gatanga	Gatanga, Kariara, Kihumbu-ini, Mugumo-ini	Mabanda, Gatunyu, Mithanduku-ini, Kirwara, Chomo, Ndunyu Chege, Samuru, Kanunga, Ndaka-ini	100	All The areas of Upper Gatanga for new and renewal of asset to improve water service levels

Conversion of Gatanga Boreholes from electrical to Solar	Gatanga	All of Gatanga	Mithanduku-ini, Mbari ya Ruga, Gatunyu, Greystone, Mugumo, Kirathani	36	
Ithanga Borehole Distributions	Gatanga	Ithanga, Kanduri, Thungururu and Ngelelya	Ngelelya health center, Mukundi, Kirathani, Kanduri, Thungururu	6	2Km @ for Ngelelya health center, Mukundi, Kirathani, Kanduri, Thungururu
Medium Term					
8Km DN325mm HDPE Rehabilitation of Wanyaga Pipeline	Gatanga	Kihumbu-ini and Kariara	Kigoro, Giachuki, Kanunga, Ndakaini, Ndunyu Chege and Gitiri	200	The existing pipeline have parallel pipeline of 325mm to the forest edge tank for 4Km where it is reduced to one pipeline of 325mm to Mukuna Tank at 1.04Km 325mm. After which it extends to Kigoro Tank 3.06Km 325mm. There is a need to improve the pipeline at the sections where pipeline is one 325mm to two Parallel lines of 325mm.
9.5Km DN 315mm - 5.5Km DN 280mm- 12.1Km DN200 - 6Km DN 160mm Kigoro Mukarara Pipeline	Gatanga	Samuru	Mukarara, Mukurwe, Kiunyu and Samuru	326	The tight rationing downstream of the pipeline and also the high demand in Samuru, Delview, Jogoo, Laini has called for the proposal. Some of the mentioned areas receive water twice in a month
Thika Kiama Dam	Gatanga	Kakuzi-Mitumbiri and Ithanga	Mac vast, Kanguku, Junction, Ngelelya, Nanga, Kahuruko, Kirathani and Kanduri	1,200	This will be a long term solution for the Ithanga Water Supply Project
NRW Capacity Building	Gatanga	All of Gatanga	All of Gatanga	6	Purchase of 2N0. Ultrasonic Flow Meter and installation of 1No. Meter Testing Bench

Long Term					
5.3Km 450mm, 4.1Km 400mm, 6.3Km 315mm, 5.5Km 280mm, 6.3Km 225mm, 5km 200mm, 2.5Km 160mm Kiama Kigio Pipeline	Gatanga	Kariara, Gatanga and Mugumo-ini	Gatura, chomo, Rwegetha, Kirwara, Gaitegi, Gakurari, Muthuri, Ithangarari and Kigio	466	The demand in the areas mentioned is growing fast, considering the splitting of the flower farms to plots, growth of estates like Maki
Thithi Jogoo Pipeline	Gatanga	Samuru and Mugumo-ini	Mabanda, Rwaitira, Gatunyu, Mithanduku-ini, Golden pearl, and Jogoo	606.60	Growing of Demand downstream and reducing water rationing
Kirwara Dam	Gatanga	Gatanga, Mugumo-ini and Samuru	Gatanga, Kirwara, Kigio, Mabanda, Mithanduku-ini, Laini, Gatunyu	935.93	
Proposed Gatura Sewerage Project	Gatanga	Kariara	Gatura town	1,200	Town of Gatura and Environs
Proposed Kirwara Sewerage Project	Gatanga	Gatanga	Kirwara town	900	Town of Kirwara and Environs
Proposed Gatunyu DTF Project	Gatanga	Mugumoini	Gatunyu Shopping Center	30	Town of Gatunyu and Environs
Proposed Chomo DTF Project	Gatanga	Kariara	Chomo Shopping Center	30	Town of Chomo and Environs
Proposed Ndunyu Chege DTF Project	Gatanga	Gatanga	Ndunyu Chege Shopping Center	30	Ndunyu Chege and Environs
Purchase of an Exhauster	Gatanga	All	Gatanga and Ithanga Subcounties	20	To be used to exhaust septic and waste water conservancy Tank
Total				6,612.53	
Grand Total				32,406.96	

5.3 **SANITATION AND HYGIENE SERVICES INVESTMENT PLAN**

Given the sanitation and hygiene status and service gaps described in 2.3 above, the County Government intends to implement strategies that will in the next 5 years upscale sanitation status. CLTS strategy will be implemented in villages which still have some of their members practicing open defecation. In villages where not practicing open defecation, market-based sanitation approach will be used to systematically move those villages up the sanitation ladder according to Rural Sanitation and Hygiene (RuSH) Protocol.

- i) Community-based behavior change (CLTS, adapted CLTS, Community Health Clubs, Follow-Up Mandona).
- ii) Market-based sanitation and technical support (non-market technical support, market-based sanitation).
- iii) Sanitation finance and support to the disadvantaged (sanitation financing, targeted incentives for indigent households).

The RuSH protocol strengthens the phased approach to sanitation by introducing grading system.

The JMP framework, developed by WHO and UNICEF, provides a globally accepted methodology for monitoring progress on sanitation and hygiene under the Sustainable Development Goals (SDGs), particularly SDG Target 6.2. Aligning the RuSH Protocol monitoring framework with the JMP ensures that Kenya's data is internationally comparable, enhancing credibility in global reporting and enabling benchmarking against other countries.

Table 7.7 Murang'a County HHs grading based on the RuSH Protocol

No.	JMP Framework	RuSH Grade	Grade Name	% of Households (KPHC,2019)
1.	Safely managed sanitation	Grade 3 (G3)	Clean and Health	0
2.	Basic Sanitation	Grade 2 (G2)	Safe and Sustainable	7 (73,964 hh)
3.	Limited Sanitation	Grade 1 (G1)	Open Defecation Free (ODF)	87.2 (921,390 hh)
4.	Unimproved Sanitation	Grade 1 (G1)	Open Defecation Free (ODF)	5.5 (59,172 hh)
5.	Open Defecation	Grade 0 (G0)	Unsafe return of Excreta to the Environment	0.2 (2,114 hh)

Based on data from the KPHC 2019 and the KDHS 2022, Murang'a County is classified as one of the lowest open defecation burden counties. According to the KPHC 2019, 7% of households in the County have access to at least basic sanitation services, 5.5% have unimproved sanitation services, 87.2% have limited sanitation services access while 0.2% practice open defecation. It therefore, means that other than eliminating open defecation, the county has to implement interventions aimed at improving sanitation access up the sanitation services ladder. The 99.8% of the households that have sanitation facilities than do not meet

criteria for “at least basic sanitation” should be encouraged or supported to push them up the sanitation ladder.

5.3.1 PROJECT 1: TO DELIVER 2,478 VILLAGES IN MURANG'A COUNTY ODF THROUGH CLTS APPROACH

The 0.2% of the households (2,113) that still practice open defecation will be helped to start climbing sanitation ladder through the CLTS strategy. This will involve capacity building of Public Health Officers (PHOs) who are the principal implementers of the strategy. Community Health Promoters (CHPs) and National Government Administrative Officers (NGAOs) particularly Assistant County Commissioners (ACCs) for Wards with villages practicing OD. All the villages that are OD will be included in this sanitation improvement implementation strategy. The process starts with village Triggering followed by Claiming and then Verification. After verification, Certification is carried out and finally the village is declared Open Defecation Free (ODF). Celebration is held crown that achievement and Post ODF follow ups to ensure that the village sustains its sanitation status. An OD village stands at Grade 0 in the sanitation ladder and when it attains ODF status it climbs to Grade 1. Such a village will be followed up and motivated to sustain and gradually upscale to Grade 2 and finally Grade 3.

Table 7.8; Project Details and Cost Estimates

No.	Project	Activity	Estimated Cost per Unit/village	Total	Grand Total
1.	Capacity building of PHOs, CHPs, PIU, ACCs, Local artisans and Hardware stockist for CLTS	Training of 91 PHOs on CLTS	Ksh. 47,000	Ksh. 4,277,000	
		Sensitize 175 CHPs on CLTS	Ksh. 10,500	Ksh. 1,837,500	
		Sensitize 30 PIU on CLTS	Ksh. 6,000	Ksh. 180,000	
		Sensitize 35 ACCs on CLTS	Ksh. 6,000	Ksh. 210,000	
		Training of 36 artisans improved sanitary facilities that are climate resilient	Ksh. 13,500	Ksh. 486,000	
		Training of 15 Local hardware stockiest from each sub county on improved sanitary facilities that are climate resilient	Ksh. 13,500	Ksh. 1,822,500	
					Ksh. 8,813,000
2.	Delivering 285 OD	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 855,000	

	villages to in ODF Kiharu Sub County	Triggering of 285 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 3,420,000	
		Claiming of 285 villages	Ksh. 3,000	Ksh. 855,000	
		Verification of 285 villages	Ksh. 8,000	Ksh. 2,280,000	
		Certification of 285 villages	Ksh. 6,000	Ksh. 1,710,000	
		Quality control for 285 villages	Ksh. 10,000	Ksh. 2,850,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 59,850,000	
					Ksh. 71,820,000
3.	Delivering 204 villages to in ODF Kahuro Sub County	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 612,000	
		Triggering of 204 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 2,448,000	
		Claiming of 204 villages	Ksh. 3,000	Ksh. 612,000	
		Verification of 204 villages	Ksh. 8,000	Ksh. 1,632,000	
		Certification of 204 villages	Ksh. 6,000	Ksh. 1,224,000	
		Quality control for 204 villages	Ksh. 10,000	Ksh. 2,040,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 42,840,000	
					Ksh. 50,796,000
4.	Delivering 176 villages to in ODF Kangema Sub County	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 528,000	
		Triggering of 176 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 2,112,000	
		Claiming of 176 villages	Ksh. 3,000	Ksh. 528,000	
		Verification of 176 villages	Ksh. 8,000	Ksh. 1,408,000	
		Certification of 176 villages	Ksh. 6,000	Ksh. 1,056,000	
		Quality control for 176 villages	Ksh. 10,000	Ksh. 1,760,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 36,960,000	
					Ksh. 44,352,000
5.	Delivering 313 villages to in ODF Mathioya Sub County	Pre-triggering engagement activities	Ksh. 3,000	Ksh.939,000	
		Triggering of 313 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 3,756,000	
		Claiming of 313 villages	Ksh. 3,000	Ksh.939,000	
		Verification of 313 villages	Ksh. 8,000	Ksh. 2,504,000	
		Certification of 313 villages	Ksh. 6,000	Ksh. 1,878,000	
		Quality control for 313 villages	Ksh. 10,000	Ksh. 3,130,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 65,730,000	
					Ksh. 78,876,000
6.	Delivering 300 OD	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 900,000	

	villages to ODF in Maragua Sub County	Triggering of 300 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 3,600,000	
		Claiming of 300 villages	Ksh. 3,000	Ksh. 900,000	
		Verification of 300 villages	Ksh. 8,000	Ksh. 2,400,000	
		Certification of 300 villages	Ksh. 6,000	Ksh. 1,800,000	
		Quality control for 300 villages	Ksh. 10,000	Ksh. 3,000,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 63,000,000	
					Ksh. 75,600,000
7.	Delivering 164 OD villages to ODF in Ithanga Sub County	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 492,000	
		Triggering of 164 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 1,968,000	
		Claiming of 164 villages	Ksh. 3,000	Ksh. 492,000	
		Verification of 164 villages	Ksh. 8,000	Ksh. 1,312,000	
		Certification of 164 villages	Ksh. 6,000	Ksh. 984,000	
		Quality control for 164 villages	Ksh. 10,000	Ksh. 1,640,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 34,440,000	
					Ksh. 41,328,000
8.	Delivering 327 OD villages to ODF in Gatanga Sub County	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 981,000	
		Triggering of 327 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 3,924,000	
		Claiming of 327 villages	Ksh. 3,000	Ksh. 981,000	
		Verification of 327 villages	Ksh. 8,000	Ksh. 2,616,000	
		Certification of 327 villages	Ksh. 6,000	Ksh. 1,962,000	
		Quality control for 327 villages	Ksh. 10,000	Ksh. 3,270,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 68,670,000	
					Ksh. 82,404,000
9.	Delivering 321 OD villages to ODF in Kigumo Sub County	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 963,000	
		Triggering of 321 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 3,852,000	
		Claiming of 321 villages	Ksh. 3,000	Ksh. 963,000	
		Verification of 321 villages	Ksh. 8,000	Ksh. 2,568,000	
		Certification of 321 villages	Ksh. 6,000	Ksh. 1,926,000	
		Quality control for 321 villages	Ksh. 10,000	Ksh. 3,210,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 67,410,000	
					Ksh. 80,892,000
10.	Delivering 388 OD	Pre-triggering engagement activities	Ksh. 3,000	Ksh. 1,164,000	

	villages to ODF in Kandara Sub County	Triggering of 388 villages in Kiharu subcounty	Ksh. 12,000	Ksh. 4,656,000	
		Claiming of 388 villages	Ksh. 3,000	Ksh. 1,164,000	
		Verification of 388 villages	Ksh. 8,000	Ksh. 3,104,000	
		Certification of 388 villages	Ksh. 6,000	Ksh.2,328,000	
		Quality control for 388 villages	Ksh. 10,000	Ksh. 3,880,000	
		Celebration of ODF villages	Ksh. 210,000	Ksh. 81,480,000	
					Ksh. 98,676,000
SUB-TOTAL 1					633,557,000.00

5.3.2 PROJECT 2: TO CONDITIONALLY INCENTIVIZE 318,105 HOUSEHOLDS TO PUT UP A STANDARD HAND WASHING POINTS NEAR THE TOILET/LATRINE

Table 7.9 Hand hygiene unit costs

Item	Cost in Ksh./HH
Household promotion	3,135
Hand hygiene facilities	1,750
Soap (per year)	2,160
Total	7,045

Source; Costed Kenya Rural Sanitation and Hygiene Roadmap – 2023 to 2030

Table 8.0 Project details and cost estimates

Sub county	Total No. of households	Unit cost in Ksh.	Total in Ksh.
Kiharu	34,734	7,045	245,013,636
Kahuro	26,930	7,045	189,721,850
Kangema	25,293	7,045	178,189,185
Mathioya	28,400	7,045	200,078,000
Maragua	55,998	7,045	394,505,910
Kandara	50,704	7,045	357,209,680
Kigumo	40,552	7,045	285,688,840
Gatanga	35,479	7,045	249,949,555
Ithanga	19,982	7,045	140,773,190
Sub-Total 2			2,241,129,864.00

5.3.3 . PROJECT 3: WASH INVESTMENTS FOR HEALTHCARE FACILITIES

The county will in the next five years invest considerably in all level 2 health care facilities (dispensaries) and level 3 health care facilities (health centers). There are 120 level 2 HCs and 28 level 3 HCs.

Table 8.1 ; HCF per sub-county

Sub county	No. of Dispensaries	No. of health centers	Total No. HCFs
Kiharu	8	1	9
Kahuro	9	6	15
Kangema	16	4	20
Mathioya	16	4	20
Maragua	15	2	17
Kigumo	16	4	20
Kandara	24	1	25
Gatanga	14	2	16
Ithanga	2	4	6
	120	28	148

5.3.4 Level 2 Health Care Facilities

For every level 2 facility, the following sanitation infrastructure will be put up to improve sanitation and hygiene services:

- i) A 7-door ablution block comprising of 7 water closets (WCs); 3 for female clients, 2 for male clients with a urinal, 1 for female staff and 1 for male staff.
- ii) A 6,000 liters capacity septic tank.
- iii) Gutters for rain water harvesting with 3 plastic storage water tanks each with capacity of 5,000 liters.
- iv) Menstrual hygiene management infrastructure (a covered waste bin and a hook for bag). These items will be placed in the 4 female WCs.
- v) 3 hand washing points placed strategy next to the ablution block (one will be used by female clients, the other one will be for male clients and the last one will be used by both male and female staff.
- vi) Color coded bins for health care waste management. 3 red coded bins, 3 yellow coded bins and 3 black coded bins, 12 safety boxes, a waste collection trolley and assorted bin liners for every HC facility per year.

Table 8.2 Project Details and Cost Estimates

Sub county	Project	Unit Cost	Total	Grand Total
Kiharu – 8 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 8 dispensaries	Ksh. 1,197,200	Ksh. 9,577,600	Ksh. 9,577,600
	ii) Construction of a 6,000 liters capacity septic tank in 8 dispensaries.	Ksh. 276,870	Ksh. 2,214,960	Ksh. 2,214,960
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 8 dispensaries	Ksh. 119,950	Ksh. 359,850	Ksh. 2,878,800
	iv) To procure 4 menstrual hygiene	Ksh. 3,500	Ksh. 14,000	Ksh. 112,000

	management waste bins and a hook for bag for 8 dispensaries			
	v) To erect 3 standard hand washing points next to the ablution block in 8 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 141,600
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 8 dispensaries	Ksh. 18,700	Ksh. 149,600	Ksh. 149,600
	Total			Ksh. 15,074,560
Kahuro – 9 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 9 dispensaries	Ksh. 1,197,200	Ksh. 10,774,800	Ksh. 10,774,800
	ii) Construction of a 6,000 liters capacity septic tank in 9 dispensaries.	Ksh. 276,870	Ksh. 2,491,830	Ksh. 2,491,830
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 9 dispensaries	Ksh. 119,950	Ksh. 1,079,550	Ksh. 1,079,550
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 9 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 126,000
	v) To erect 3 standard hand washing points next to the ablution block in 9 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 159,300
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 9 dispensaries	Ksh. 18,700	Ksh. 168,300	Ksh. 168,300
	Total			14,799,780
Kangema - 16 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in	Ksh. 1,197,200	Ksh. 19,155,200	Ksh. 19,155,200

	16 dispensaries			
	ii) Construction of a 6,000 liters capacity septic tank in 16 dispensaries.	Ksh. 276,870	Ksh. 4,429,920	Ksh. 4,429,920
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 16 dispensaries	Ksh. 119,950	Ksh. 359,850	Ksh. 5,757,600
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 16 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 224,000
	v) To erect 3 standard hand washing points next to the ablution block in 16 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 283,200
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 16 dispensaries	Ksh. 18,700	Ksh. 299,200	Ksh. 299,200
	Total			Ksh. 30,149,120
Mathioya- 16 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 16 dispensaries	Ksh. 1,197,200	Ksh. 19,155,200	Ksh. 19,155,200
	ii) Construction of a 6,000 liters capacity septic tank in 16 dispensaries.	Ksh. 276,870	Ksh. 4,429,920	Ksh. 4,429,920
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 16 dispensaries	Ksh. 119,950	Ksh. 359,850	Ksh. 5,757,600
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 16 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 224,000
	v) To erect 3 standard hand washing points next to the ablution block in 16 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 283,200
	vi) To procure assorted	Ksh. 18,700	Ksh. 299,200	Ksh. 299,200

	color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 16 dispensaries			
	Total			Ksh. 30,149,120
Maragua – 15 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 15 dispensaries	Ksh. 1,197,200	Ksh. 17, 958,000	Ksh. 17, 958,000
	ii) Construction of a 6,000 liters capacity septic tank in 15 dispensaries.	Ksh. 276,870	Ksh. 4,153,050	Ksh. 4,153,050
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 15 dispensaries	Ksh. 119,950	Ksh. 359,850	Ksh. 5,397,750
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 15 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 210,000
	v) To erect 3 standard hand washing points next to the ablution block in 15 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 265,500
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 15 dispensaries	Ksh. 18,700	Ksh. 280,500	Ksh. 280,500
	Total			Ksh. 28,264,800
Kigumo – 16 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 16 dispensaries	Ksh. 1,197,200	Ksh. 19,155,200	Ksh. 19,155,200
	ii) Construction of a 6,000 liters capacity septic tank in 16 dispensaries.	Ksh. 276,870	Ksh. 4,429,920	Ksh. 4,429,920
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank,	Ksh. 119,950	Ksh. 359,850	Ksh. 5,757,600

	in 16 dispensaries			
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 16 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 224,000
	v) To erect 3 standard hand washing points next to the ablution block in 16 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 283,200
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 16 dispensaries	Ksh. 18,700	Ksh. 299,200	Ksh. 299,200
	Total			Ksh. 30,149,120
Kandara – 24 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 24 dispensaries	Ksh. 1,197,200	Ksh. 28,732,800	Ksh. 28,732,800
	ii) Construction of a 6,000 liters capacity septic tank in 24 dispensaries.	Ksh. 276,870	Ksh. 6,644,880	Ksh. 6,644,880
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 24 dispensaries	Ksh. 119,950	Ksh. 359,850	Ksh. 8,636,400
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 24 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 336,000
	v) To erect 3 standard hand washing points next to the ablution block in 24 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 424,800
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 24 dispensaries	Ksh. 18,700	Ksh. 448,800	Ksh. 448,800
	Total			Ksh. 45,223,680

Gatanga – 14 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 14 dispensaries	Ksh. 1,197,200	Ksh. 16,760,800	Ksh. 16,760,800
	ii) Construction of a 6,000 liters capacity septic tank in 14 dispensaries.	Ksh. 276,870	Ksh. 3,876,180	Ksh. 3,876,180
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 14 dispensaries	Ksh. 119,950	Ksh. 359,850	Ksh. 5,037,900
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 14 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 196,000
	v) To erect 3 standard hand washing points next to the ablution block in 14 dispensaries	Ksh. 5,900	Ksh. 17,700	Ksh. 247,800
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 14 dispensaries	Ksh. 18,700	Ksh. 261,800	Ksh. 261,800
	Total			Ksh. 26,380,480
Ithanga -2 dispensaries	i) Construction of a 7-door ablution block comprising of 7 WCs in 2 dispensaries	Ksh. 1,197,200	Ksh. 2,394,400	Ksh. 2,394,400
	ii) Construction of a 6,000 liters capacity septic tank in 2 dispensaries.	Ksh. 276,870	Ksh. 553,740	Ksh. 553,740
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 2 dispensaries	Ksh. 119,950	Ksh. 359,850	Ksh. 719,700
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 2 dispensaries	Ksh. 3,500	Ksh. 14,000	Ksh. 28,000
	v) To erect 3 standard hand washing points	Ksh. 5,900	Ksh. 17,700	Ksh. 35,400

	next to the ablution block in 2 dispensaries			
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 2 dispensaries	Ksh. 18,700	Ksh. 37,400	Ksh. 37,400
	Total			Ksh. 3,768,640
SUB-TOTAL 3				223,959,390.00

5.3.5 Level 3 Health Care Facilities

For every level 3 facility, the following sanitation infrastructure will be put up to improve sanitation and hygiene services:

- i) A 7-door ablution block comprising of 7 water closets (WCs); 3 for female clients, 2 for male clients with a urinal, 1 for female staff and 1 for male staff.
- ii) A 6,000 liters capacity septic tank.
- iii) Gutters for rain water harvesting with 3 plastic storage water tanks each with capacity of 5,000 liters.
- iv) Menstrual hygiene management infrastructure (a covered waste bin and a hook for bag). These items will be placed in the 4 female WCs.
- v) 3 hand washing points placed strategy next to the ablution block (one will be used by female clients, the other one will be for male clients and the last one will be used by both male and female staff.
- vi) Color coded bins for health care waste management. 5 red coded bins, 5 yellow coded bins and 5 black coded bins, 20 safety boxes, a waste collection trolley and assorted bin liners for every HC facility per year.
- vii) An incinerator for health care waste treatment.

Table 8.3 Project Cost Estimates

Sub county	Project	Unit Cost	Total	Grand Total
Kiharu – 1 health center (Kambirwa)	i) Construction of a 7-door ablution block comprising of 7 WCs in Kambirwa health center	Ksh. 1,197,200	Ksh. 1,197,200	Ksh. 1,197,200
	ii) Construction of a 6,000 liters capacity septic tank in Kambirwa health center	Ksh. 276,870	Ksh. 276,870	Ksh. 276,870
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in Kambirwa health center	Ksh. 119,950	Ksh. 119,950	Ksh. 119,950
	iv) To procure 4	Ksh. 3,500	Ksh. 14,000	Ksh. 14,000

	menstrual hygiene management covered waste bin and a hook for bag for Kambirwa health center			
	v) To erect 3 standard hand washing points next to the ablution block in Kambirwa health center	Ksh. 5,900	Ksh. 5,900	Ksh. 5,900
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for Kambirwa health center	Ksh. 41,000	Ksh. 41,000	Ksh. 41,000
	vii)To construct an incinerator in Kambirwa health center. -Environmental Impact Assessment	Ksh. 1,195,540 Ksh. 70,000	Ksh. 1,265,540	Ksh. 1,265,540
	Total			Ksh. 1,920,460
Kahuro – 6 health centers	i) Construction of a 7-door ablution block comprising of 7 WCs in 6 health centers	Ksh. 1,197,200	Ksh. 7,183,200	Ksh. 7,183,200
	ii) Construction of a 6,000 liters capacity septic tank in 6 health centers.	Ksh. 276,870	Ksh. 1,661,220	Ksh. 1,661,220
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 6 health centers	Ksh. 119,950	Ksh. 358,500	Ksh. 2,151,000
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 6 health centers	Ksh. 3,500	Ksh. 14,000	Ksh. 84,000
	v) To erect 3 standard hand washing points next to the ablution block in 6 health centers	Ksh. 5,900	Ksh. 17,700	Ksh. 106,200
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley	Ksh. 41,000	Ksh. 246,000	Ksh. 246,000

	for health care waste management for 6 health centers			
	vii) To construct an incinerator in 6 health centers. -Environmental Impact Assessment	Ksh. 1,195,540 Ksh. 70,000	Ksh. 1,265,540	Ksh. 7,593,240
	Total			Ksh. 19,024,860
Kangema – 4 health centers	i) Construction of a 7-door ablution block comprising of 7 WCs in 4 health centers	Ksh. 1,197,200	Ksh. 4,788,800	Ksh. 4,788,800
	ii) Construction of a 6,000 liters capacity septic tank in 4 health centers	Ksh. 276,870	Ksh. 1,107,480	Ksh. 1,107,480
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 4 health centers	Ksh. 119,950	Ksh. 359,850	Ksh. 1,439,400
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 4 health centers	Ksh. 3,500	Ksh. 14,000	Ksh. 56,000
	v) To erect 3 standard hand washing points next to the ablution block in 4 health centers	Ksh. 5,900	Ksh. 17,700	Ksh. 70,800
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 4 health centers	Ksh. 41,000	Ksh. 164,000	Ksh. 164,000
	vii) To construct an incinerator in 4 health centers. -Environmental Impact Assessment	Ksh. 1,195,540 Ksh. 70,000	Ksh. 1,265,540	Ksh. 5,062,160
	Total			Ksh. 12,688,640
Mathioya- 4 health centers	i) Construction of a 7-door ablution block comprising of 7 WCs in 4 health centers	Ksh. 1,197,200	Ksh. 4,788,800	Ksh. 4,788,800

	ii) Construction of a 6,000 liters capacity septic tank in 4 health centers	Ksh. 276,870	Ksh. 1,107,480	Ksh. 1,107,480
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 4 health centers	Ksh. 119,950	Ksh. 359,850	Ksh. 1,439,400
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 4 health centers	Ksh. 3,500	Ksh. 14,000	Ksh. 56,000
	v) To erect 3 standard hand washing points next to the ablution block in 4 health centers	Ksh. 5,900	Ksh. 17,700	Ksh. 70,800
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 4 health centers	Ksh. 41,000	Ksh. 164,000	Ksh. 164,000
	vii) To construct an incinerator in 4 health centers.	Ksh. 1,195,540	Ksh. 1,265,540	Ksh. 5,062,160
	-Environmental Impact Assessment	Ksh. 70,000		
	Total			Ksh. 12,688,640
Maragua – 2 health centers	i) Construction of a 7-door ablution block comprising of 7 WCs in 2 health centers	Ksh. 1,197,200	Ksh. 2,394,400	Ksh. 2,394,400
	ii) Construction of a 6,000 liters capacity septic tank in 2 health centers	Ksh. 276,870	Ksh. 553,740	Ksh. 553,740
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 2 health centers	Ksh. 119,950	Ksh. 359,850	Ksh. 719,700
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 2 health centers	Ksh. 3,500	Ksh. 14,000	Ksh. 28,000
	v) To erect 3 standard	Ksh. 5,900	Ksh. 17,700	Ksh. 35,400

	hand washing points next to the ablution block in 2 health centers			
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 2 health centers	Ksh. 41,000	Ksh. 82,000	Ksh. 82,000
	vii) To construct an incinerator in 2 health centers. -Environmental Impact Assessment	Ksh. 195,540 Ksh. 70,000	Ksh. 1,265,540	Ksh. 2,531,080
	Total			Ksh. 6,344,320
Kigumo – 4 health centers	i) Construction of a 7-door ablution block comprising of 7 WCs in 4 health centers	Ksh. 1,197,200	Ksh. 4,788,800	Ksh. 4,788,800
	ii) Construction of a 6,000 liters capacity septic tank in 4 health centers	Ksh. 276,870	Ksh. 1,107,480	Ksh. 1,107,480
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 4 health centers	Ksh. 119,950	Ksh. 359,850	Ksh. 1,439,400
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 4 health centers	Ksh. 3,500	Ksh. 14,000	Ksh. 56,000
	v) To erect 3 standard hand washing points next to the ablution block in 4 health centers	Ksh. 5,900	Ksh. 17,700	Ksh. 70,800
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 4 health centers	Ksh. 41,000	Ksh. 164,000	Ksh. 164,000
	vii) To construct an incinerator in 4 health centers. -Environmental Impact	Ksh. 195,540 Ksh. 70,000	Ksh. 1,265,540	Ksh. 5,062,160

	Assessment			
	Total			Ksh. 12,688,640
Kandara – 1 health center (Kagumoini)	i) Construction of a 7-door ablution block comprising of 7 WCs in Kagumoini health center	Ksh. 1,197,200	Ksh. 1,197,200	Ksh. 1,197,200
	ii) Construction of a 6,000 liters capacity septic tank in Kagumoini health center	Ksh. 276,870	Ksh. 276,870	Ksh. 276,870
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in Kagumoini health center	Ksh. 119,950	Ksh. 119,950	Ksh. 119,950
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for Kagumoini health centre	Ksh. 3,500	Ksh. 14,000	Ksh. 14,000
	v) To erect 3 standard hand washing points next to the ablution block in Kagumoini health center	Ksh. 5,900	Ksh. 5,900	Ksh. 5,900
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for Kagumoini health center	Ksh. 41,000	Ksh. 41,000	Ksh. 41,000
	vii)To construct an incinerator in Kagumoini health center. -Environmental Impact Assessment	Ksh. 1,195,540 Ksh. 70,000	Ksh. 1,265,540	Ksh. 1,265,540
	Total			Ksh. 2,920,460
Gatanga – 2 health centers	i) Construction of a 7-door ablution block comprising of 7 WCs in 2 health centers	Ksh. 1,197,200	Ksh. 2,394,400	Ksh. 2,394,400
	ii) Construction of a 6,000 liters capacity septic tank in 2 health	Ksh. 276,870	Ksh. 553,740	Ksh. 553,740

	centers			
	iii) Procure, deliver and install three 5,000-liter plastic mold water tank, in 2 health centers	Ksh. 119,950	Ksh. 359,850	Ksh. 719,700
	iv) To procure 4 menstrual hygiene management covered waste bin and a hook for bag for 2 health centers	Ksh. 3,500	Ksh. 14,000	Ksh. 28,000
	v) To erect 3 standard hand washing points next to the ablution block in 2 health centers	Ksh. 5,900	Ksh. 17,700	Ksh. 35,400
	vi) To procure assorted color-coded bins, bin liners, safety boxes and waste collection trolley for health care waste management for 2 health centers	Ksh. 41,000	Ksh. 82,000	Ksh. 82,000
	vii) To construct an incinerator in 2 health centers. -Environmental Impact Assessment	Ksh. 1,195,540 Ksh. 70,000	Ksh. 1,265,540	Ksh. 2,531,080
	Total			Ksh. 6,344,320
Sub-total 4				74,620,340.00

Table 8.4 Cost Summary for Sanitation projects

Item	Project	Amount Kshs.
1	Delivery 2,478 Villages ODF through Community Led Total Sanitation (CLTS) Approach	633,557,000.00
2	Incentivization of 318,105 households to put up standard hand washing points near their toilets/latrines	2,241,129,864.00
3	Wash investments for Level 2 Health Care Facilities	223,959,390.00
4	Wash investments for Level 3 Health Care Facilities	74,620,340.00
Grand Total Sanitation Projects		3,173,266,594.00

5.3.7 Murang'a South Water and Sanitation Company Limited (MUSWASCO)

Table 5.4.1: Hygiene Projects

S/NO.	PROJECT	Activity	Output	Outcome	Indicator	Location	COST (Ksh. M)	Source of funds	Responsible	STATUS
1.	Construction and operation of the Kabati-Methi-Makenji Sewerage infrastructure (Makutano phase 2)	Pond excavation and trenching of sewer network .Construction of sewage infrastructure including manholes,pipe networks and ponds	Completed sewerage infrastructure	Improved sanitation in Kabati, Methi, and Makenju	Number of household s connected, sewage treatment capacity	Kabati, wempa	1,500	WSP/AWWD A/ County	MD/TM/FM	Housing Project to be done in Makenji and also Kabati is highly urbanized
2.	Construction of Sewerage treatment infrastructure in Kangari,	Pond excavation and trenching of sewer network .Construction of sewage infrastructure including manholes,pipe networks and ponds	Completed treatment plant	Improved water quality in Kangari	Treatment plant capacity, effluent quality	Kangari, Sabasaba and Maragua	1,200	WSP/AWWD A/ County	MD/TM/FM	Treatment plant is at Mareira Firm
3.	Construction of Sewerage treatment infrastructure	Pond excavation and trenching of sewer network	Completed treatment plants	Improved water quality in Sabasaba and Maragua	Treatment plant capacity, effluent quality	Sabasaba town,Maragua town, Summary	3,000	WSP/AWWD A/ County	MD/TM/FM	Treatment plant to be done at Maragua-Samar area

S/NO.	PROJECT	Activity	Output	Outcome	Indicator	Location	COST (Ksh. M)	Source of funds	Responsible	STATUS
	e in Sabasaba and Maragua	.Construction of sewage infrastructure including manholes,pipe networks and ponds								
4.	DTF- Kigumo town, Kandara town	Excavation and Construction works.	Completed Decentralized Treatment facility	Improved sanitation in Kandara town and its environs	No. of sewer trucks received, effluent discharge quality	Kigumo,mu hithi and Kandara	60	WSP/AWWD A/ County	MD/TM/FM	The coverage is not very big to accomodate a full treatment plant and so DTF are proposed
5.	Constructio n 1000no. flush pour toilets with septic tank to improve sanitation within the pro poor areas i.e. Kabati, Kenol, Kangari, Kandara and Sabasaba	Rehabilitation of existing pit latrine with slab and construction of septic and soak pit Construction of new improved flush pour toilets	1000no. complete toilets	Improved sanitation in pro-poor areas	No of persons using improved toilets	Kabati, Kenol, Kangari, Kandara and Sabasaba	2	WSTF/WSP/C OUNTY	MD/TM/FM	We did 500no. under WSTF UBSUP project and the results were very positive hence it is a good course that should continue
	Total						5,762			

5.3.8 Murang'a Urban Water and Sanitation Company Limited (MUWASCO)

Table 5.4.2.: Hygiene Projects

Interventions	Constituency	Ward	Areas Served	Cost (Kshs. Millions)	Remarks
St Mary's sewer extension project	Kiharu	Township	Township	82	Improve sanitation in the area – St. Mary", Kiharu and along Kangema road
Kambwe and Mukuyu sewer extension project	Kiharu	Township	Township	98	Improve sanitation in the area – Mukuyu, Mashambani and Kambwe
New Murang'a Municipality sewerage	Kiharu	Township, Mbiri, Gaturi	Townshi, Mbiri, Gaturi	1,700	The project seeks overhaul the current sewerage system and increase coverage into the fast growing suburbs
Total				1,880	

5.3.9 Murang'a West Water and Sanitation Company Limited

Table 5.6.1.: Hygiene Projects

Interventions	Constituency	Ward	Areas Served	Cost (Kshs. M)	Remarks
Kangema Sewerage Project	Kangema	Muguru, Wangu	Kangema urban and surrounding institutions	500	Study already undertaken by Losai Consultants
Kahatia Sewerage Project	Kangema	Kanyenyaini	Kahatia town and its environs	200	Fast growing rural urban center
Kahuro DTF Project	Kiharu	Mugoiri	Kahuro town and its environs	50	Moderately-growing rural urban center
Kanorero DTF Project	Kangema	Muguru	Kanorero town and its environs	50	Moderately-growing rural urban center
Kanyenyaini DTF Project	Kangema	Kanyenyaini	Kanyenyaini town and its environs	50	Moderately-growing rural urban center
Total				850	

5.3.10 Gatamathi Water and Sanitation Company Limited

Table 5.7.1

Interventions	Constituency	Ward	Areas Served	Cost (Kshs. M)	Remarks
Kiriaini Sewerage system	Mathioya	Kiru	Kiria-ini and its environs (Kiria-ini Primary, Kiria-ini Girls, Secondary, Kiriaini Mixed Secondary Day school, Goshen Farm Hotel. Mathioya Sub County offices, Kiriani Mission Hospital - Level 4 and dispensary.	950	Safe disposal of waste matter.
30 number Decentralized Treatment Facility at 25,000,000.00	Mathioya,Kangema,Kiharu	Kiru,Kamacharia,Rwathia,Gitugi,Kamacharia	Gacharegeini, Gacharegeini, Gatunguru, Rwathia , Kihoya, Kiawambogo, Tuthu, Kihoya, Wanjerere, Kagongo, Mioro, Kiamuturi, Gikoe, Gitugi, Mihuti, Kenyanjeru, Kairo, Kiambuthia, Kora, Kagumoini, Kiambuthia, Kamune, Kamacharia, Iruru, Thuita, Geitwa, Gakurwe, Gaitheri, Kiambuigi, Nyakihai, Kigetuini, Muringa and Gakuyu.	750	Safe disposal of waste matter within the mentioned rapidly growing shopping centres

Vacuum Truck/Exhauster	Mathioya,Kang ema,Kiharu	Kiru, Kamacharia, Rwathia, Gitugi, Kamacharia	Gatamathi supply area.	20	Safe waste disposal .
Total				1,720	

5.3.11 Gatanga Water and Sanitation Company Limited

Table 5.3.5.: Hygiene Projects

Interventions	Constituency	Ward	Areas Served	Cost (Kshs. M)	Remarks
Gatura Sewerage Project	Gatanga	Kariara	Gatura town	1,200	Town of Gatura and Environs
Kirwara Sewerage Project	Gatanga	Gatanga	Kirwara town	900	Town of Kirwara and Environs
Gatunyu DTF Project	Gatanga	Mugumoini	Gatunyu Shopping Center	30	Town of Gatunyu and Environs
Chomo DTF Project	Gatanga	Kariara	Chomo Shopping Center	30	Town of Chomo and Environs
Ndunyu Chege DTF Project	Gatanga	Gatanga	Ndunyu Chege Shopping Center	30	Ndunyu Chege and Environs
Purchase of an Exhauster	Gatanga	All	Gatanga and Ithanga Subcounties	20	To be used to exhaust septic and waste water conservancy Tank
Total				2,210	
Total Cost Hygien projects				12,422. 00	

5.4 WATER RESOURCES MANAGEMENT AND CATCHMENTS CONSERVATION INVESTMENT PLAN

The county government will work together with the Water Resources Authority, the department of forestry and environment and the Water resource user associations to ensure that all catchment areas are pegged, rehabilitated and protected. Below are the strategies in these catchment protection programmes. Priority projects are also listed in the table below.

5.4.1 Collaboration with WRA;

The county government of Murang'a is highly collaborated with WRA to ensure all its water supply infrastructure are duly registered and permits issued and that they are renewed as required. However financial constraints especially in WSPs do not permit timely permit renewals. Efforts that are put in place to raise revenues are expected to address these concerns.

Table 5.4.2: Catchment Conservation, Protection of Water Resources Program

No.	Objectives	Intervention	Achieved	Target	Year					Total Cost (KSh.M)	Implementing Agency
					2024	2025	2026	2027	2028		
1	To strengthen water planning allocation and compliance with Water Act 2016.	Enhance Riparian area by marking & pegging.	Approx. 40 km ² area conserved	Increase in acreage of riparian land area marked and pegged for protection and conservation in the sensitive ecological areas. 12 km per year	450,000	450,000	450,000	450,000	450,000	2.25	WRA MCG and PARTNERS
		Improve protection and conservation of water catchment areas	52 No. Spring protected the last 5yrs	Scale up spring protection of Sub Catchment Management Plans by WRUA. 10 springs per. Year.	2.5m	2.5m	2.5 M	2.5 m	2.5m	12.5	WRA MCG and PARTNERS
		To promote and develop alternative water sources	85 No. of tanks (10 m3) issued to community .	Increase water harvesting tanks. 3 No. of 10m3 tank per year	390,000	390,000	390,000	390,000	390,000	1.95	WRA MCG and PARTNERS
		To Enhance Water quality	10 .no .done	Increase the number of water abstraction and & Pollution Surveys	600000	600000	600000	600000	600000	3	WRA MCG and PARTNERS

No.	Objectives	Intervention	Achieved	Target	Year					Total Cost (KSh.M)	Implementing Agency
					2024	2025	2026	2027	2028		
		monitoring		1.No. abstraction survey per year							
		Capacity Building of stakeholders	54 No done	Increase water resources protection from pollution in urban and peri-urban areas by community representative and stakeholders" engagement. 2.No per year	200,000	200,000	200,000	200,000	200,000	1	WRA MCG and PARTNERS
		Enhance riparian security and solid waste assessment	Rehabilitation activities on riparian areas done 30 % done	Increase in riparian activities carried for protection and conservation of rivers.by tree planting and vegetation cover of 300km per year	1.25M	1.25M	1.25M	1.25M	1.25M	6.25	WRA MCG and PARTNERS
		Enhance sanitation and sewage disposal in identified river basins	Sensitization of community on sewerage disposal (60. No hold public baraza	Scale up of effluent discharge and sanitation compliance by awareness creation and forums within river basins with stakeholders (4	400,000	400,000	400,000	400,000	400,000	2	WRA MCG and PARTNERS

No.	Objectives	Intervention	Achieved	Target	Year					Total Cost (KSh.M)	Implementing Agency
					2024	2025	2026	2027	2028		
2	To enhance WRUA, county and stakeholder partnerships	Increase partnership through networking and collaboration	Present members 5 No.	Increase in number of partnerships between WRUAs, stakeholders and partners	50,000	50,000	50,000	50,000	50,000	0.25	WRA and MCG
		Increased targeted funding.		Increase in number of successful funding proposals.	200,000	200,000	200,000	200,000	200,000	1	WRA MCG and PARTNERS
		Sustainable and improved livelihoods and job creation for WRUAs members.	100 No. capacity building meetings done.	Scale up the number of livelihood on capacity-building sessions with WRUAs on activities that are aligned to water catchments and BETA economic modeling. (3 No capacity building trainings per year	300,000	300,000	300,000	300,000	300,000	1.5	WRA MCG and PARTNERS
			Scmp implementation 30% done	- % increase in implementation of sub-catchment management plans what number have we	5m	5m	5m	5m	5m	25	WRA MCG and PARTNERS
Total										56.7 m	

5.4.3 Investments Summary

a) Total proposed Investment s: Domestic Water. = Kshs. 32,606,960,000.00

b)WSP Sanitation = Kshs 12,422,000,000.00

c) Heath care facilities Sanitation..... = Kshs. 3,173,266,594.00

d)Catchment protection= Kshs. 56, 7 00,000.00

Grand total Kshs. 48,258,926,594.00 Say Kshs 48.26 Billion

The total investments for universal access to water and improved sanitation in Murang'a County is **Kshs 48,258,926,594.00** (Kenya Shillings Forty –Eight Billion, Two hundred and Fifty -Eight Million, Nine Hundred and Twenty-Six Thousand, Five Hundred Ninety- Four Kenya shillings only.

5.5 INSTITUTIONAL REFORMS AND SERVICES DELIVERY MODELS (SDM)

The water act 2016 created several institutions with the aim of separating the functions of policy, regulation and service provision. Below is the summary of these institutions.

Tabelle 5.5.1: Water sector institutions created by the water act 2016

WATER SECTOR INSTITUTIONS			
Level	Resources Management Institutions	Service Provision Institutions	Function
National	Ministry Of Water , Sanitation and Irrigation		Policy Formulation
	Water Resources Authority (WRA)	Water Sector Regulatory Board (WASREB)	Regulation
Regional	Basin Water Resources Committees (Bwrc)	Water Works Development Agencies (WWDAs)	Service Provision
Local	Water Resources Associations	Water Service Providers (WSPs)	Consumption Or Use
	Water Resources Management	Water And Sewerage Services	

Functional of water sector policy formulation was left with the National while the role of regulation was left with the Water Resources Authority. At the regional level, the water Works Development Agencies, a National Government parastatal was charge with the execution of capital water infrastructure works.

The county Government was to take charge of Water and sewerage services provision using the WSPs at the local level. Athi Water works development Agency undertakes capital water infrastructure project in Murang'a, Kiambu, Nairobi and Kanjio. The county government of Murang'a supplies water and sewerage service in Murang'a using its five regulated WSPs. The County department of water supervises water and sanitation services provision in the county.

- **Lessons from best practices**

The county government paid learning trip to Nyeri Water and Sanitation Company Limited to learn best practices in water and sanitation services delivery. Some of the lessons learnt include achievement of Nyewasco eg in NRW of 18 Percent , smart meter reading , 24 hour supply with minimal rationing, water storage facilities among other best practices. The county is implementing some of those lessons learnt.

- **Role of regulatory agencies in ensuring compliance**

The water sector Regulatory board and the water resources Authority are the major agencies in the water sector mandated with regulatory work. Their roles are as follows ; - **WASREB**; Water Tariff approvals, setting service delivery standards with regard to water quality , service hours, coverage , NRW level, collection efficiencies, Revenue utilisations,

regulations on water , ranking of WSPs , issue of service provision permits, delianation of WSP boundaries and review of the same among others.

WRA: Authorisation of water abstraction from sources, issuing of water permits, renewaals of water permits, collection of water use churges, Water resource management using Water User Associations among others.

These regulatory bodies have powers to enforce compliance, they can reccommed removal of non-compliance managers, deny a WSP a Service provision permit, cut off water source , influence NEMA not to issue an Environmetal and Social

a) **Service Delivery Models the the the county**

Four models will be used to ensure accerelated access to water and sanitatation services.

These area as follows:

5.5.2 The county Government Department of Water

The department will be allocated annual budget for water services provision where the County procurement processes will be used to advertis, tender, evaluate, award and supervice water projects every financial year. The county monitoring and evaluation team will ensure that projects implemented under this model are sustainable. Completed projects will be handed over to the relevabat WSPs for operation and maintenance. However, monitoring and evaluation will continue to be done by the county government to ensure sustainability and effectiveness.

5.5.3 Water Services Providers

Each if the five water services providers will design bankable projects. They will and seek funding from development partners such as the Water Sector Trust Fund, the World Bank, AWWDA among others. The role of the county government will be to evaluate those projects and issue letters of no objections to those that are viable. Completed projects will be operated and maintained by the respective WSPs. However, the County Governmenet will continue to Monitor them for sustainablity and effectiveness.

5.5.4 Athi Water Works Development Agency

As the National Government agency responsible for undertaking capital water works development projects in Murang’a. The county governemmnt will closely work with this agency to ensure capitatal projects are carried out to bridge the gap of water services provisison. All projects carried out by the Agence will be handed over to the respective WSPs through the county government. Clear records will however be kept to avaad duplication. The county government will continue to monitore those projects to ensure they remain operational and are sustainable.

5.5.5 Private Public Partnership

The county government will endeavor to create conducive environment for partners to invest in the water sector. It will seek partners with NGOs, Foreign missions and local and international cooperates to develop the water sector.

a) "One water „planning and investment approach

The county government will form a water planning and Investment committee that will be charged with ensuring harmony in implementation of water projects both for catchment protection and water development. The members will be drawn from departments of Agriculture, Environment and climate change and forestry.

The duties of this committee will be to ensure that implementation of a **"ONE WATER"** planning and investment approach where investments and projects by other non-water departments such as Departments of Agriculture, climate change, environmental management are incorporated, planned, implemented, and monitored as part of the overall County water strategy and investment plan.

5.6 SECTOR FINANCING REQUIREMENTS AND SOURCING PLAN

5.6.1 Sector Financing Requirements

The water sector in Murang'a county will require investments for the following three programmes as shown in 5.2 and 5.3 above.

Table 8.5 Total investment costs

S/No	INVESTMENT	Total Cost (KSh. M)	Total Cost (Kshs.
1.	Access to Universal Water Supply by 2030	32,406.960	32,406,960,000 .00
2.	Access to Improved Sanitation by 2030	12,422.00	12,422,000,000 .00
3	Wsh Investments in Health care Facilities	3,173,266	33,173,266,594.00
4.	Conservation and Protection of Water Resources	56.70	56,700,000 .00
	Total	48,059	48,058.926,594.00

The total investments for universal access to water and sanitation in Murang'a County is Kshs. **48,058.926,594.00** (Forty -Eight Billion , Fifty Eight million , nine hundred and Twenty -Six thousand Five Hundred Ninety- Four Kenya shillings only. This is as detailed in the above table.

5.6.2 Sourcing plan

The county Government of Murang'a is committed to budgeting for access to water and sanitation promoted. Annual allocations will be progressively done to year 2030 and

beyond until when universal access is attained. The county will leverage on the K-Wash programme to attract more resources for the same purpose. In order to source more capital

toward universal access, the county government will partner with global, regional and local PPP partners.

5.6.3 WSPs and WSTF Programmes

Murang'a County will encourage its five regulated WSPs to design projects and seek funding from the Water sector trust fund. No objects letters and any other requirements will be given to support this programme.

5.6.4 National Government programmes such AWWDA

The county government of Murang'a will work closely with National government programmes seeking to accelerate accessibility of water and sanitation in the county. In particular, the county will work support all initiative and programmes under the AWWDA that shall be done in Murang'a County.

CHAPTER 6- ENVIRONMENTAL AND SOCIAL ASSESSMENT

Situational analysis on the existing environmental, health and safety risks in WASH sector

6.1.1 ; Environmental and Health –analysis of environment and health risks

Environmental Health and Safety (EHS) in the WASH Sector: Safeguards for Murang'a County

Investments in Water, Sanitation, and Hygiene (WASH) must balance public health benefits with environmental and safety risks. Below is an analysis of key EHS concerns, safeguard policies, and mitigation strategies for Murang'a County.

6.1.2. Key Environmental Health Risks in WASH

Table 8.6 ;Water Contamination Risks

Risk	Source	Impact
Fecal Pollution	Poorly constructed latrines, open defecation	Diarrhea, cholera outbreaks
Chemical Contamination	Fertilizer/pesticide runoff, fluoride in groundwater	Kidney disease, dental fluorosis
Heavy Metals	Industrial waste, corroded pipes	Long-term toxicity (e.g., lead in Murang'a Town pipes)

Mitigation measures

- Source Protection Zone groundwater wells $\geq 50\text{m}$ from latrines (WHO guidelines).
- Water Quality Testing Monthly checks for E. coli, nitrates, fluoride.

Tablr 8.7 Sanitation-Related Hazards

Risk	Example in Murang’a	Health Impact
Pit Latrine Collapse	5 incidents (2022) in Kigumo	Injuries, fatalities
Manual Pit Emptying	Workers exposed to raw sewage	Hepatitis A, parasitic infections
Flooding of Toilets	Maragua River floods (2023)	Contaminated water sources

Mitigation

- Safer Latrine Designs: Reinforced slabs, ventilation pipes.
- Mechanized Emptying: Provide suction trucks to reduce worker exposure.

6.1.3 . Safety Risks for Workers and Communities

Table 8.8 . Occupational Hazards

Risk	Affected Group	Safeguard Measure
Trench Collapses	Borehole drillers	Slope stabilization, protective gear
Chemical Exposure	Water treatment plant staff	PPE (gloves, masks), spill kits
GBV During Water Fetch	Women/girls in remote areas	Lit water kiosks, community patrols

B. Community Safety

- Drowning Risks: Uncovered water tanks/reservoirs (e.g., 2 child deaths in 2022).
- Vector Breeding: Stagnant water from leaky pipes leading to malaria/dengue infection.

Mitigation

- Childproof Covers: For storage tanks (Murang’a County By-Laws).
- Drainage Maintenance: Clear blockages to prevent mosquito breeding.

6.1.4 . Environmental Safeguards in WASH Projects

Table 8.9 . Regulatory Frameworks

Policy	Relevance to Murang’a
WHO Sanitation Guidelines	Sets standards for safe excreta disposal
NEMA Wastewater Rules	Requires permits for sewage discharge
County Public Health Act	Mandates latrine inspections in markets/schools

B. Key Safeguard Measures

1. Environmental Impact Assessments (EIAs):
 - Required for dams, large boreholes (e.g., Maragua Dam EIA 2021).
2. Ecological Protection:
 - Buffer zones near rivers to prevent pollution (e.g., Mathioya River).
3. Climate Resilience
 - Flood-proof toilets in flood-prone areas (Kandara, Gatanga).

4. Social Safeguards: Protecting Vulnerable Groups

Tablr 9.0 Gender and Disability Inclusion risks

Risk	Safeguard
Women’s Safety	Gender-segregated toilets with locks/lights
PWD Access	Ramps, handrails in 10% of public toilets

B. Community Engagement

- Free, Prior, Informed Consent (FPIC): For projects on communal land.
- Grievance Redress Mechanisms (GRMs): Toll-free lines plus local committees.

5. Case Study: Safeguards in the Kiharu Water Project

- Challenge: Borehole drilling risked contaminating a wetland.
- Actions Taken
 - Conducted EIA plus community consultations.
 - Installed solar-powered pumps to reduce diesel pollution.

Outcome: Zero complaints; wetland preserved.

6. Recommendations

A. For Policymakers

- Enforce EIA Compliance: Penalize non-compliant contractors.
- Fund Safeguard Training: For county health inspectors.

B. For Implementers

- Adopt WHO’s WASH Safety Plans: For all new infrastructures.
- Use Low-Cost Sensors: To monitor water quality in real-time.

C. For Communities

- Report Violations: Via county hotline (0722-XXX-XXX).
- Participate in Audits**: Demand transparency in WASH projects.

Murang’a’s WASH sector must prioritize environmental health, worker safety, and social inclusion to avoid harm. Proactive safeguards—EIAs, FPIC, and GRMs—are non-negotiable for sustainable development.

6.1.5 Permitting and monitoring Plan

Environmental Health and Safety (EHS) in WASH: Permitting and Monitoring Plans for Murang’a County

To ensure safe and sustainable water, sanitation, and hygiene (WASH) services, Murang’a County has robust permitting systems and monitoring frameworks that address environmental, health, and safety risks. Below is a structured guide to EHS compliance in the WASH sector.

1. Permitting Requirements for WASH Projects

All WASH projects in Murang'a will comply with national and county regulations to mitigate environmental and public health risks.

Table 9.1 Key Permits and Approvals

Permit Type	Issuing Authority	When Required	Validity Period
Water Abstraction License	Water Resources Authority (WRA)	Boreholes, dams, river withdrawals	5 years (renewable)
NEMA EIA License	National Environment Mgmt. Authority (NEMA)	Large-scale projects (e.g., sewage plants)	Project lifespan
County Public Health Permit	Murang'a Health Department	Latrines, water kiosks, waste disposal	1–3 years
Construction Permit	County Physical Planning	Water tanks, pipelines, sanitation blocks	Until completion

Example: A new borehole in Kiharu requires:

1. WRA permit (for groundwater extraction).
2. County health inspection (to ensure safe siting from latrines).

2. Monitoring Plans for EHS Compliance

Regular monitoring ensures WASH projects do not harm health or ecosystems.

6.1.7 Water Quality Monitoring

Table 9.2 Water quality Monitoring data

Parameter	Frequency	Standard (KEBS)	Responsible Agency
Fecal Coliforms	Monthly	0 CFU/100ml	County Public Health
Fluoride	Quarterly	≤1.5 mg/L	WRA
Turbidity	Weekly	≤5 NTU	Water Service Providers

Tools

- Portable test kits for field checks.
- GIS-based dashboards (e.g., Murang'a Water Portal) for real-time data.

Table 9.3 Sanitation Safety Monitoring

Risk	Indicator	Corrective Action
Pit Latrine Overflow	Fecal sludge ≥75% capacity	Immediate emptying plus soil remediation
Open Defecation	>5% of households in a ward	CLTS triggering plus latrine subsidies
Vector Breeding	Mosquito larvae in stagnant water	Drainage clearance plus larviciding

Reporting:

- Quarterly EHS reports submitted to NEMA and the county.
- Community whistleblowing via SMS (#888# WASH Alert line).

6.1.8 Safeguards for Vulnerable Groups**A. Gender and Disability Inclusion**

- Permit Condition; 10% of public toilets must be PWD-accessible (ramps, handrails).
- Annual audits by Murang'a Disability Network.

B. Livelihood Protection

- Requirement: Projects displacing vendors/farmers must provide alternative income (e.g., water kiosk jobs).
- Example: Gatanga Dam project trained 50 farmers as fish breeders.

Table 9.4 Penalties for Non-Compliance

Violation	Fine (KES)	Additional Action
Operating without a permit	50,000–200,000	Project suspension
Water contamination	100,000–500,000	Mandatory cleanup plus prosecution
Safety negligence	20,000–100,000	Worker retraining

Case: A Murang'a Town water vendor was fined KES 150,000 in 2023 for selling untreated river water.

Table 9.5 Institutional Roles and Responsibilities

Agency	EHS Role
Murang'a Water Services Board	Issues permits, monitors piped systems
County Health Department	Inspects sanitation facilities, tests water
WRA	Registers boreholes, enforces abstraction
Community Health Volunteers (CHVs)	Report violations at village level

6. Recommendations for Improvement

1. Digitize Permitting: Online portal for faster approvals (e.g., e-County WASH Platform).
2. Community-Based Monitoring: Train youth groups to test water quality.
3. Climate Adaptation: Enforce flood-resilient toilet designs in flood-prone zones (e.g., Kandara).

Murang'a's WASH sector needs strict permitting, proactive monitoring, and inclusive safeguards to protect environmental health and safety. Accountability mechanisms (fines, public reporting) are critical for compliance.

6.2 SOCIAL ASSESSMENT OF THE COUNTY**6.2.1 Analysis of social risks and mitigation measures**

Social Assessment for Murang'a County: Risks & Mitigation in WASH Projects

This analysis identifies key social risks in water, sanitation, and hygiene (WASH) initiatives and proposes practical mitigation measures to ensure equitable, conflict-free, and sustainable outcomes.

1. Key Social Risks in Murang’a’s WASH Sector

Table 9.6 Land and Resource Conflicts

Risk	Hotspots	Impact
Water Source Disputes	Kandara, Mathioya Rivers	Violent clashes between farmers/herders
Privatization of Commons	Boreholes on private land	Poor excluded from access

Root Causes:

- Weak land tenure systems (60% of land untitled).
- Elite capture of water points.

Table 9.7 Exclusion of Vulnerable Groups

Group	Exclusion Risk	Data
Persons with Disabilities (PWDs)	Lack of accessible toilets	<5% of WASH facilities are PWD-friendly
Women/Girls	Limited roles in water committees	Only 20% female participation (SNV 2023)
HIV-Affected HHs	Stigma at shared water points	30% report denial of access (UNICEF 2022)

C. Negative Livelihood Impacts

- Loss of Income: Water vendors displaced by piped systems.
- Ecological Damage: Over-extraction dries rivers, harming fishing.

2. Social Risk Mitigation Strategies

Table 9.8 Conflict Prevention in Water Projects

Strategy	Action	Example in Murang’a
Free, Prior, Informed Consent (FPIC)	Engage all land users before drilling	Used in Kiharu borehole project
Benefit-Sharing Agreements	Guarantee community water access	Ndakaini Dam water-sharing pact
Transparent Allocation	Publicly post water schedules	Mathioya River users’ Association

Table 9.9 Inclusive Service Delivery

Approach	Implementation	Target Group
Quotas for Marginalized Groups	30% seats for women/PWDs in committees	Kangema Water Project
Universal Design	Build ramps, handrails in 10% of toilets	PWDs in Murang’a Town
Anti-Stigma Campaigns	Train water operators on HIV sensitivity	HIV+ households in Gatanga

Table 10. Livelihood Protection

Measure	How It Works	Case Study
Vendor Retraining	Teach water sellers to maintain piped systems	50 vendors trained in Maragua
Ecological Safeguards	Minimum river flow rules	Mathioya River conservation plan

3. Monitoring and Accountability

A. Grievance Redress Mechanisms (GRMs)

- Toll-free line#888# WASH Alert for reporting violations.
- Community Liaisons: CHVs mediate disputes in villages.

B. Equity Audits

- Annual scorecards tracking:
 - % female/PWD participation.
 - Water access by income level.

4. Case Study: Mitigating Risks in Gatanga CLTS

- Risk: Elders resisted latrines as "unhygienic."
- Solution:
 - Dialogues with religious leaders.
 - Demonstration toilets to dispel myths.
- Outcome: 100% ODF villages by 2023.

Table 10.1 Recommendations

Priority	Action	Responsible Agency
Policy Reform	Pass County WASH Equity Act	County Assembly
Targeted Subsidies	Free connections for poorest 20%	Water Services Board
Community Training	Teach conflict resolution plus maintenance	NGOs (e.g., SNV, Red Cross)

Murang'a's WASH projects face land conflicts, exclusion, and livelihood risks, but participatory planning, inclusive design, and strict monitoring can mitigate these. Invest in social safeguards now to avoid costly disputes later.

6.2.2 Affordability and Stakeholder Management

Social Assessment for Murang'a County: Affordability and Stakeholder Management in WASH Programs.

This assessment evaluates water and sanitation affordability and stakeholder engagement strategies to ensure inclusive, sustainable WASH services in Murang'a County.

1. Affordability Analysis

Table 10.2; Cost Burden on Households

Income Group	Avg. Monthly Income (KES)	Monthly Water/Sanitation Spend (KES)	% of Income Spent on WASH
Low-Income (Bottom 20%)	≤5,000	800–1,200	16–24% (High burden)
Middle-Income	15,000–50,000	500–800	3–5% (Moderate)
High-Income	50,000 plus	150–300	<1% (Low burden)

Key Issues

- Poorest household spend 4–6 times more per liter than wealthy ones (vendors vs. piped water).
- 60% of female-headed households sacrifice food/education budgets for water.

B. Barriers to Affordability

1. High Connection Fees (KES 5,000 plus) exclude low-income families.
2. Flat Tariffs favor high-volume users (e.g., irrigators over domestic needs).
3. Informal Water Vendors charge exploitative prices during droughts.

Table 10.3 Pro-Poor Solutions

Intervention	How It Works	Example
Lifeline Tariffs	Free first 6m ³ /month (20L/day)	Nairobi's pro-poor model
Sliding-Scale Fees	Discounts for ≤KES 10K/month households	Mombasa's WASH program
Connection Subsidies	Waive fees for vulnerable groups (PWDs, elderly)	Kiharu pilot project

2. Stakeholder Management Strategies

Table 10.4 Key Stakeholders and Interests

Stakeholder	Primary Interest	Potential Conflict Risk
County Government	Revenue collection, service expansion	Imposing tariffs without consultation
Water User Associations	Fair allocation, maintenance	Elite capture of resources
Women's Groups	Safe, nearby water access	Exclusion from decision-making
Private Operators	Profitability	Overcharging poor households

Table 10.5 . Engagement Best Practices

Strategy	Implementation	Expected Outcome
Participatory Budgeting	Public forums to set tariff rates	Increased trust, compliance
Gender-Responsive Committees	50% women in water boards	Equitable service design
Grievance Redress (GRM)	Toll-free line (#888#) plus local liaisons	Quick conflict resolution

C. Conflict Mitigation Measures

1. Water Allocation Transparency

- Public dashboards showing real-time supply schedules.
- Priority access for vulnerable groups (e.g., morning hours for women).

2. Compensation for Displacement

- Offer alternative livelihoods (e.g., training water vendors as pump operators).

3. Case Study: Gatanga's Affordability Success

- Challenge: Vendors charged KES 20/20L during droughts.
- Solution
 - County installed 10 community water kiosks with lifeline tariffs.
 - Trained women's groups to manage them.
- Result
 - 50% drop in household water costs.
 - Zero conflicts over water in 2 years.

4. Table 10.6 ; Recommendations

Priority Action	Responsible Agency	Timeline
Adopt Sliding-Scale Tariffs	Water Services Board	6 months
Launch GRM System	County Health Department	3 months
Train 200 Women as WASH Managers	NGOs (e.g., SNV)	1 year

To ensure equitable WASH access, Murang'a shall;-

1. Reduce costs for the poor via tariffs/subsidies.
2. Engage stakeholders proactively to prevent conflicts.

6.2.3 Environmental and social risks in Murang'a

Floods , mud slides and land slides are the major risks in Murang'a county. Mitigation, resilience and adaptation measures are normally put in place . Corroboration between stakeholders both at the County and National Level join together to address these environment and social issues. Generally environmental, health and safety risks in the county are highly pronounced in three subcounties where the terrain is hilly and the rainfall is high. These are Kigumo, Kangema and Mathioya sub-counties.

6.2.4 Effects of Land Slides and Floods

People have been displaced and taken to temporary camps because landslides washing away their livelihood. Deaths were reported in upper parts of Muranga in the year 2023 . Tea bushes have been washed away resulting to loss of livelihoods.. Houses have been destroyed in various parts during recent floods and landslides in Kangema sub-county. Water infrastructure have been destroyed in various locations. These disasters have brought very hard effects on the social economic life of Muranga residents especially in Kigumo, Kangema and Mathioya sub-counties.

CHAPTER SEVEN

7.0 IMPLEMENTATION ROADMAP, MONITORING AND EVALUATION AND COMMUNICATION PLAN

7.1. Monitoring and Evaluation Plan

Monitoring, Evaluation Learning and Reporting Framework (MELR) forms an integral part in the implementation of the County Water and Sanitation Strategy and Investment Plan (CWSS&IP) 2024-2028. It tracks and assesses whether the achievement of planned activities, targets, projects, and programmes are on course. It also documents challenges encountered, emerging issues as well as lessons learnt to inform decision making. It is expected that the Monitoring, Evaluation, Learning and Reporting Unit will be activated under the Planning Directorate.

The Monitoring and Evaluation of the Murang'a County Water and Sanitation Strategy and Investment Plan (CWSSIP) will be done within the context of the County Integrated Monitoring and Evaluation Systems (CIMES) and Murang'a County M&E Policy. The involved sectors shall have the responsibility of contributing towards the achievement of the universal water, sanitation and hygiene coverage by the year 2030 outcomes through the implementation of the Sectoral Strategic Plans (SSPs) and County Annual Development Plans (CADPs). The plan shall operatively involve the use of participatory monitoring and evaluation approach across all the sectors. This approach shall assist in ensuring the involvement of stakeholders in the monitoring and Evaluation of the plan implementation.

7.2 Monitoring and evaluation

Monitoring and Evaluation (M&E) Plan for Social Inclusion and Equity in Murang'a County WASH Projects

This M&E plan ensures fair distribution of WASH services and active participation of marginalized groups in project monitoring.

Table 10.7 ;Key Indicators for Tracking Social Equity

Dimension	Indicator	Data Source	Target
Geographic Equity	% of WASH projects allocated to marginalized wards	County project databases	$\geq 30\%$
Gender Inclusion	% of women in water user committees	Committee attendance records	50%
PWD Accessibility	% of WASH facilities with disability-friendly features (ramps, handrails)	Infrastructure audit reports	20%
Livelihood Impact	% of project jobs/contracts awarded to youth/women/PWDs	Procurement records	35%
Community Feedback	Number of grievances resolved from marginalized groups (via GRM)	Grievance redress system logs	90%

Table 10.8 Data Collection Methods

Tool	Frequency	Responsible Party	Marginalized Group Focus
Household Surveys	Bi-annual	CHVs/NGOs	Women, PWDs, elderly
Focus Group Discussions (FGDs)	Quarterly	Social Development Office	HIV-affected HHs, pastoralists
Project Audits	Annual	County Water Dept	Accessibility for PWDs
GRM Analytics	Monthly	WASH Committee	Slum dwellers, youth

3. Marginalized Group Participation in Monitoring

A. Strategies to Ensure Inclusion

1. Community-Based Monitors (CBMs)

- Train 10 women/youth/PWDs per ward to inspect projects and report issues.
- Provide smartphones for real-time data uploads to Murang'a WASH Dashboard

2. Participatory Budgeting Forums

- Hold bi-annual meetings** where marginalized groups prioritize projects.

3. Inclusive GRM

- Toll-free line (#888#) with voice prompts for illiterate users.
- Mobile vans to collect feedback in remote areas (e.g., Gatanga).

B. Incentivizing Participation

- Stipends for CBM volunteers (KES 1,500/month).
- Public recognition (e.g., "Equity Champion" awards).

Table 10.9 Equity-Targeted Project Distribution

Criterion	Allocation Rule	Example
Poverty Level	50% of new boreholes in poorest wards (per KNBS)	Kigumo Sub-County priority
Gender Vulnerability	Latrines in girls' schools with MHM rooms	Kangema Mixed Secondary
Disability Prevalence	1 accessible water point per 500 PWDs	Murang'a Town market

Table 11 Reporting and Accountability

Report	Contents	Audience	Frequency
Equity Scorecard	Ward-level project distribution, GRM stats	County Assembly	Quarterly
Inclusion Dashboard	Real-time CBM updates, photos	Public (online)	Monthly
Annual Social Audit	Independent review of participation fairness	NEMA, Donors	Annual

7.3 Challenges and Mitigation

Table 11.1 Challenges and mitigations proposed

Risk	Mitigation Strategy
Low CBM retention	Provide certificates plus stipends
Elite capture of resources	Publicly post project budgets/beneficiaries
Data gaps on PWDs	Partner with Murang'a Disability Network

This M&E plan ensures transparent, inclusive WASH service delivery in Murang'a by:

1. Tracking equity metrics (gender, disability, poverty).
2. Empowering marginalized groups** to monitor projects.
3. Enforcing accountability through public reporting.

7.4 Communication and advocacy plan-information dissemination /advocacy

To effectively use a communication and advocacy plan to influence social norms, promote hygiene practices, and encourage community ownership of WASH (Water, Sanitation and Hygiene) facilities in Murang'a County, you'll need a strategic and community-centered approach. Here's a step-by-step framework tailored for the local context:

1. Understand the Local Context

Conduct formative research: Identify existing hygiene practices, beliefs, taboos, and influencers in Murang'a.

Map stakeholders: Involve county government, public health officers, religious leaders, teachers, women's groups, youth groups, and local NGOs.

2. Set Clear Objectives

Examples:

Increase handwashing with soap at critical times by 40% within 12 months.

Improve latrine use and cleanliness in rural villages.

Ensure 70% of households contribute to maintenance of community WASH facilities.

3. Develop Tailored Messages

Design behavior change messages around:

Cultural norms and values: Use local proverbs, stories, and role models.

Benefits of hygiene: Healthier children, fewer hospital bills, dignity.

Social accountability: Encourage positive peer pressure.

4. Use Multiple Channels

Community radio: Broadcast hygiene messages in Kikuyu and Swahili.

Local events and barazas: Use chief's meetings to disseminate info.

Schools: Engage pupils through hygiene clubs and WASH ambassadors.

Religious platforms: Partner with churches and mosques for message delivery.

Social media: Target youth with short hygiene videos and graphics.

5. Empower and Train Local Champions

Train CHVs (Community Health Volunteers), teachers, and youth leaders in hygiene promotion.

Equip them with IEC (Information, Education and Communication) materials.

Reward active promoters to motivate sustained engagement.

6. Promote Community Ownership

Involve communities in design, construction, and management of WASH facilities.

Set up WASH committees with clear roles (e.g. cleaning schedules, fee collection).

Encourage cost-sharing or contribution of local materials for repairs.

7. 5 Monitor, Evaluate, and Adapt

Use participatory tools like community scorecards and feedback forums.

Regularly collect data on behavior changes and facility use.

Adjust messages and methods based on findings.

Would you like a sample communication and advocacy plan template tailored for Murang'a County?

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7.6 Advocacy /communication plan

Communication and Advocacy Plan to Shift Social Norms, Promote Hygiene, and Strengthen WASH Ownership in Murang'a County

This plan uses strategic messaging, community engagement, and advocacy to:

1. Transform harmful social norms (e.g., gender roles in water fetching, open defecation).
2. Promote hygiene behaviors (hand washing, menstrual health).
3. Encourage community ownership of WASH facilities.

Table 11.2; Target Audience Segmentation

Group	Key Barriers	Advocacy Approach
Women/Girls	Taboos around menstruation, water-fetching burden	Female-led hygiene campaigns, MHM education
Men/Boys	Handwashing seen as "unmanly," control over water decisions	Engage male champions, sports metaphors
Elders/Religious Leaders	Resistance to latrine adoption	Dialogues linking cleanliness to faith
Youth	Lack of engagement in WASH maintenance	WASH Youth Ambassadors" program
County Officials	Underfunding equity-focused WASH	Data-driven advocacy (e.g., ROI studies)

2. Key Messages and Channels

Table 11.3; Shifting Social Norms

Message	Tactic	Channel
Water Fetching is Everyone's Responsibility	Male role models fetching water	Radio dramas, TikTok challenges
A Clean Home is a Proudful Home	Community clean-up competitions	Local chiefs' barazas, WhatsApp groups
Toilets Prevent Disease	Testimonials from reformed open defecators	Church/mosque sermons, posters

Table 11.4; Promoting Hygien

Behavior	Message	Channel
Handwashing	5 Critical Times to Wash Hands " (after toilet, before eating)	School clubs, murals
Menstrual Hygiene	"Periods are Natural—Use Safe Pads"	Girls' mentorship programs, kiosks
Water Treatment	"Boil or Chlorinate—Don't Guess!"	Door-to-door CHVs, market skits

Table 11.5 . Encouraging Ownership

Message	Tactic	Example
"Our Facility, Our Pride"	Name toilets after local heroes (e.g., "Mama Amina Latrine")	Gatanga's adoption model
"Report Vandalism!"	Reward system for whistleblowers	SMS code #888# plus KES 500 reward

Table 11.6 . Advocacy Activities Timeline

Activity	Timeline	Partners
Launch "Men for Water" Campaign	Month 1–3	Media houses, male leaders
Train 50 Youth WASH Ambassadors	Month 4	Schools, NYS
County WASH Equity Forum	Month 6	Governor's office, NGOs
MHM Awareness Week	Month 9	Health clinics, women's groups

7.6 . Community Ownership Strategies

A. Participatory Design

- Involve users in toilet/borehole siting (e.g., women choose locations for safety).

B. Asset Transfer Ceremonies

- Hand over facilities via public signing of maintenance contracts (e.g., Kandara's borehole pact).

C. "Adopt-a-Facility" Program

- Assign churches/schools to monitor cleanliness (e.g., St. Paul's Church in Murang'a Town).

Table 11.7 Measuring Success

Indicator	Tool	Target
Percentage of households with handwashing stations	Spot checks	Plus 40% in Year 1
Number of women in water committees	Meeting attendance records	50%
Reduction in open defecation	CLTS verification	100% ODF
GRM resolution rate	Complaint logs	90%

6. Case Study: Radio Diaries for Norm Change

- Approach:

- "Water Warriors" radio show featured men discussing water-sharing.
- Listeners called in to pledge behavior changes.

- Result:

- 35% increase in male water-fetching participation (2023).

Table 11.7 ; Budget and Partners

Item	Cost (KES)	Responsible Party
Radio spots (3 months)	300,000	County Communication department
Youth ambassador kits	500,000	UNICEF/NGOs
MHM demo pads	200,000	Ministry of Health

This plan combines norm-shifting communication, accountability mechanisms, and participatory ownership models to sustainably improve WASH in Murang'a. Consistent messaging and community empowerment are key.

7.7 Reporting Mechanism

The Monitoring, Evaluation, Learning and Reporting (MELR) of the County Water and Sanitation Strategy and Investment Plan (CWSS&IP) and shall be coordinated by the Departments of Water, Public Health, Education and Economic Planning as the MERL Unit. However, the overall responsibility of overseeing and managing the monitoring and evaluation of the CWSSIP will be on the CECM responsible for Water, Irrigation, Environment and Natural Resources.

The MELR Unit will work closely with the Technical teams at the County level and shall advise the CECM to ensure that strategies are being implemented, performance is being measured, progress reports are prepared and discussed, and corrective action is taken where necessary. To determine the timelines, quality of data, and compliance with work plans that have been approved every four months, sectoral reports known as Quarterly County Annual Progress Reports (CAPRs) will be required.

These reports will be submitted to the MERL Unit to mark the milestones achieved on the CWSS&IP goals and objective with clear strategies to correct any variance from the expected outcomes.

Mid-term and end-term evaluation shall highlight the implementation efficiency and impacts of the CWSSIP for the purpose of learning and improvement. These shall then be consolidated by the MERL Unit into the County Annual Progress Report.

published for circulation to stakeholders, after approval by the County Executive. The monitoring and evaluation of this plan implementation shall be aligned to CIDP indicators and reporting timelines.

7.7 M&E reporting data and information management frame work at county level.

This is the plan to track the progress of the water and sanitation services provision to ensure we meet policy goals and address any necessary variation or adjustments that may occur.

7.8 Reporting Mechanism

The management of each WSP will be reporting to the CEC water and sanitation quarterly, mid- term and annually on the implementation progress of water and sanitation programme and project.

7.9 M&E Indicators- 2

This plan M&E defines indicators as detailed, quantifiable pieces of information that are used to measure progress towards intended goals and objectives and show current successes or difficulties. These indicators will be used in assessing achievement of the set plan objectives. The M&E Outcome indicators and targets for the CWSS&IP (2024-2028) are summarized in the Results Matrix below.

M& E indicators

- Records of household connected with water and sanitation
- Water coverage levels in respective supply areas
- Sanitation coverage levels in respective supply areas
- Water quality analysis reports
- Revenue generated
- Non revenue water levels
- Risk assessment, mitigation and adaption measure taken

7.9.1 Data Management for Decision-Making

Data management will be instrumental in the M&E process especially when documenting the process and outcomes of implementing the CWSS&IP. This will help in identifying sound strategies that will be suitable in enhancing the county's universal water and sanitation coverage goals. The collection of data will utilize both primary and secondary data to track the implementation of the CWSS&IP.

Administrative records as well as other documentation allowed by the County administration will be used for secondary data collection gathering whereas; primary data shall be obtained through structured questionnaires, reporting formats and periodical interviews with key stakeholders.

To improve reliability of data, quantitative data will be collected at specified intervals while the qualitative data will be collected occasionally. This will help the county to monitor both the key material and non-material indicators of universal water and sanitation coverage at the same time. The results will be presented in form of charts and data visualization tools as this will simplify the process of sharing the outcome with the decision makers and other stakeholders.

7.10 Evaluation Plan

This section discusses how the CWSS&IP implementation will be evaluated. It shall involve Mid-term and End-term assessments. These evaluations will focus on the relevance, effectiveness, and impact of the CWSS&IP implementation, as well as the sustainability of the achieved outcomes. The mid-term evaluation will assess the progress of policy implementation at midpoint, identifying areas for improvement and adjusting strategies as necessary. The end-term evaluation will be carried out at the end of CWSS&IP implementation with the aim of ascertaining extents of CWSS&IP impact, outcomes, and implications on Universal Water and Sanitation Coverage in the long run.

The evaluations will be based on identified key evaluation questions that are mainly focused on aspects of relevance, effectiveness, efficiency, impact and Sustainability of the interventions. An evaluation plan will be prepared that would identify the aim and objectives, methodology adopted, instruments for data collection, and time frame for the different evaluation.

7.11 Communication and Advocacy Plan

The purpose of this communications strategy is to enhance the communications, visibility, and capacity of K-WASH to convey information aimed at the current Population of 1,056,640 persons in Murang'a County to access improved water and sanitation services, eliminate open defecation, and improve the financial performance of water services providers.

The objective of this assignment is to provide technical backstopping to the county towards the preparation of a comprehensive County-wide Water and Sanitation Strategy and Investment Plan and during the implementation.

The communication advocacy aims at reaching the local community to advocate for Water accessibility and conservation, improved sanitation, use of piped and metered water and prevention of water pollution.

The key messages will be conveyed mainly in the local dialect Kikuyu, Kiswahili and English. The Communications efforts will make use of new and traditional media to reach the whole population, and include messages targeting the visual and audio impaired people. The channels that will be used to convey the messages will include but not limited to: Digital media, electronic media, print media, meetings, workshops, and others as suited to the target audience.

The Monitoring and Evaluation plan will gauge whether the Communications Strategy is effective in delivering the communications goals. It will review the effectiveness of the communication strategies for internal and external stakeholders through surveys, website and social media performance, engagement surveys, media coverage, monitoring and evaluation, and informal/ formal feedback from the stakeholders.

Appendix 1: Murang'a County Inventory of Dams and Water Pans

S/No	Name of Dam/Pan	Locality	Estimated Targeted Beneficiaries (HH)	Functional/Non functional	Use (Domestic, Livestock, Electricity, Irrigation)	Physical Status (silted, breached, etc)	Remarks/Required Interventions
1	Katipanga /Ngimu Dam 1	Kimorori area in Wempa ward maragua subcounty	50	Non functional	livestock watering	Silted ,no spillway & dilapidated dam wall	Requires redesign & reconstruction
2	Katipanga /Ngimu Dam 2	Kimorori area in Wempa ward –maragua sub county	300	Non functional	Livestock watering	Silted & dilapidated spillway	Requires de silting , spillway rehabilitation & fencing
3	Katipanga main/Ngimu Dam 3	Kimorori area in Wempa ward margua sub county	800	Functional	Domestic , minor irrigation & livestock watering	Good. Have moderate water level ,silted & dilapidated spillway	Requires de silting , spillway rehabilitation & fencing
4	Punda Milia Dams	Punda Milia in Makuyu ward, maragua sub county	700	Functional	Domestic Irrigation Livestock	Silted. Have moderate water level	Dams require de-silting , spillway reconstruction & fencing
5	Iganjo/Silanga water pan	Iganjo area in Kamahuha ward maragua sub county	200	Non functional	Dried up	Silted up	Requires reconstruction of water pan
6	Kaharati/Silanga Dam	Kaharati area in Kamahuha ward maragua sub county	200	Partially Functional	Domestic & Livestock	Dam wall and Spillway demolished. Dam area completely encroached. No water	Requires de-silting, Re-design and construction of dam wall and spillway.

7	Dera Dam	Makuyu, Kambiti ward maragua sub county	300	Functional	Domestic , minor irrigation & livestock watering	Good. Has moderate water level.	Rehabilitation of spillway, fencing & de silting required
8	Githanja Dam	Kenol area in Wempa ward- maragua sub county	350	Functional	Domestic , minor irrigation & livestock watering	Good. Has moderate water level	Requires de-silting , construction of spillway and fencing
9	Mariki 1 Dam	Samar area Nginda ward -maragua	300	Functional	Domestic Irrigation Livestock	Good. Have moderate water level.	Requires reinforcement of dam wall and construction of spillway.
10	Mariki 2 Dam	Samar area Nginda ward-maragua	400	Functional	Domestic Irrigation Livestock	Good. Have moderate water level.	Requires design and construction of spillway and watering troughs for livestock away from the dam wall and improved fencing around the dam.
11	Mariki 3 Dam	Maragua, Samar area Nginda ward	450	Non functional	Dried up	Silted up and dam wall completely breached	Occupies a big surface area. However, it is completely encroached and its reservoir area is sub-divided and sold to private developers. It's one of the major storage facility compared with other dams in the vicinity. If reclaimed and re- constructed it can be

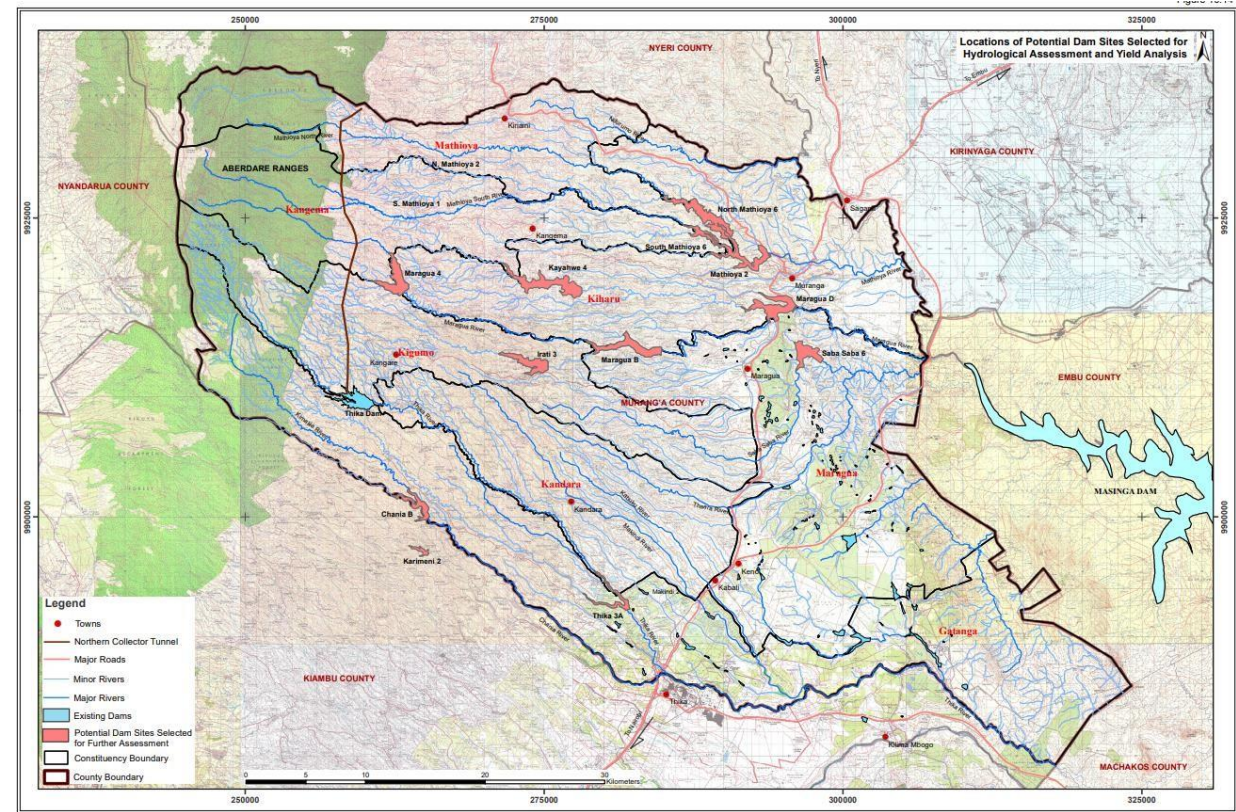
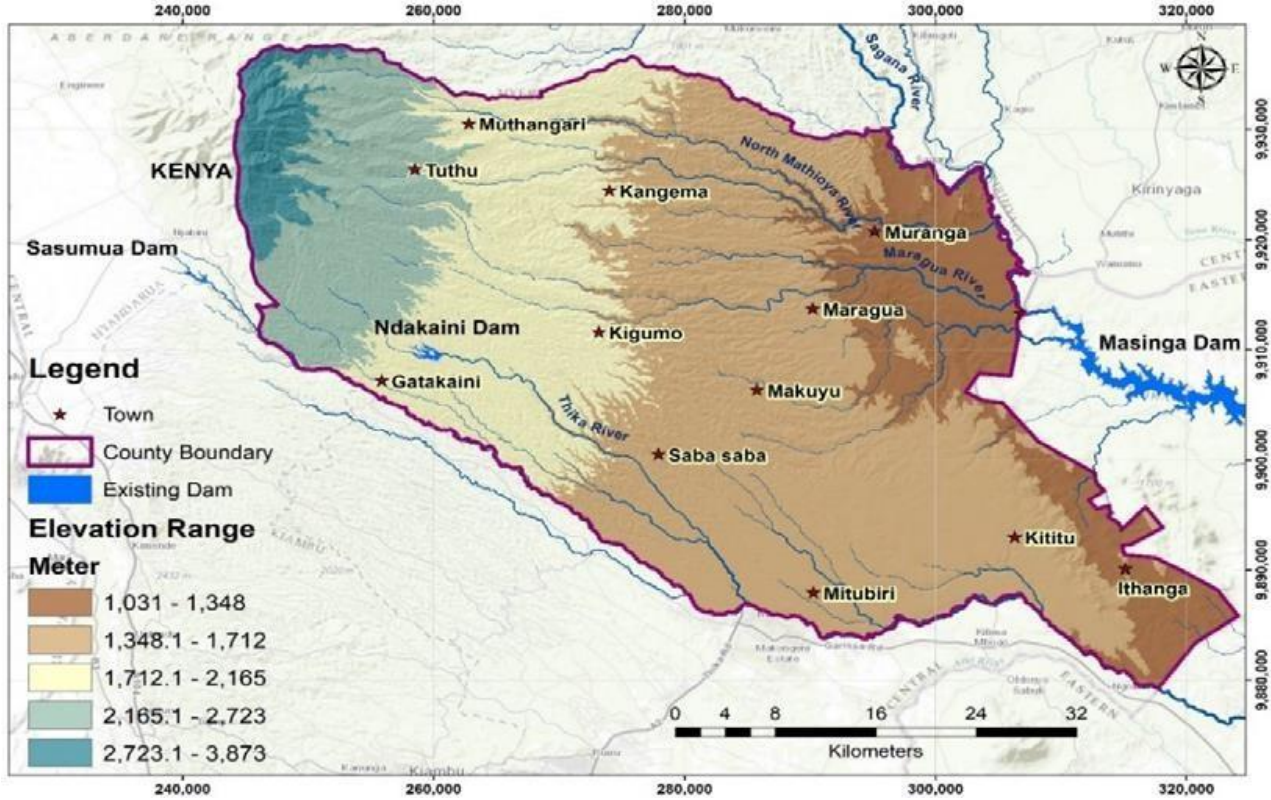
							the best source of irrigation water in the whole of Kamahuha and Kambiti locations. The dam site is occupied by absentee landlords who have leased the farms to the locals.
12	Gakoigo Dam	Maraguasub county Nginda ward	400	Functional	Domestic Livestock Coffee pulping	Silted up. Moderate water level	Requires de-silting and improvement by constructing a strong dam wall to impound more water. Dam vital for irrigation water
13	Methi-Swani Dam	Makuyu, Wempa ward=maragua sub county	350	Partially Functional	Domestic Irrigation Livestock	Poor, silted. Dam completely dry, encroachment of catchment reservoir, underground seepage and broken down spillway.	Requires de-silting and repair of the spillway.
14	Kiangamba Water pan	Maragua ridge Kambiti ward-maragua	50	Partially Functional	Livestock	Poor. Silted	Requires de-silting & reservoir enlargement
18	Mugira Dam	Makuyu, Kambiti ward maragua subcounty	250	Functional	Domestic Livestock Irrigation	Fair, clean water. Silted and spillway eroded and cut away thus emptying the dam and reducing its retention capacity.	Requires de-silting, re-designing and construction of spillway. Best for domestic and irrigation use. Dam area enclosed by adjacent farmers.

19	Marema and 49 Dams	Makuyu, Kambiti ward, Marema farm maragua sub county	60	Partially Functional	Domestic Irrigation	Heavily silted and spillway damaged	Requires de-silting, fencing, design and construction of a spillway.
20	Kianduru Dam	Makuyu, Makuyu ward Maragua sub county	65	Partially Functional	Domestic Irrigation	Heavily silted and bushy, Dam encroached, illegal farming along dam catchment, , not properly demarcated, little water, fed by three springs	Requires de-silting, fencing, protection of springs that feed the dam and clear demarcation of dam area.
21	Kitune Water Pan	Makuyu, Kambiti ward-maragua	40	Partially Functional	Domestic Livestock	Heavily silted and requires outlet construction	Requires de silting & increase reservoir capacity
22	Mitubiri Dam	Makuyu/, Wempa Ward, Kihiumwiri-maragua	300	Functional	Domestic Irrigation	Silted, spillway damaged	Requires de-silting, repair of spillway, clear demarcation of dam area, fencing and controlled abstraction. Dam is being used for horticultural farming adjacent to it.
23	Gikono Dam	Makuyu/ Wempa Ward, Mitumbiri area maragua	450	Functional	Domestic Irrigation Livestock	Encroached. Dam has a lot of water, poorly utilized, no economic activity apart from small-scale irrigation through siphoning of water.	Spillway requires re-design and construction. Riparian reserve requires protection since people have cultivated up to dam edge, a water project is necessary to supply the locals with water.

24	Wairuri dam	Maragua, Samar Kamahuhaward	50	Partially Functional	Domestic Irrigation Livestock	Silted	Requires reconstruction of dam wall & increase reservoir capacity
25	Kiboko dam	Maragua wempa ward	35	Partially Functional	livestock	Silted	Requires reconstruction of dam wall & increase reservoir capacity
26	Muli dam	Maragua kambiti ward	500	Functional	Domestic Irrigation Livestock	Partially silted	Requires de silting & fencing
27	Makuyu dam	Maragua makuyu ward	80	Functional	Domestic Livestock	Silted	Requires de silting, fencing, reconstruction of dam wall, spillway & increase reservoir capacity
28	Silanga dam	Kagundui, kandara	80	Function and being rehabilitated by N.I.A	Domestic, livestock, minor irrigation	Under going rehabilitation	Requires ownership
28	Mariira Dam	Kigumo sub county kangari ward	80	Functional	Livestock Irrigation	Heavily silted. Owned by Kenyatta ATC, Mareira.	Institutional dam. Requires de-silting and rehabilitation
29	Matunda Dam	<u>Ithanga Sub-county</u> Kakuzi/Rubiru/Kakuzi	100	Functional	Domestic Livestock Irrigation Fishing Leisure	Silted up, Vegetation growth, pollution by livestock and farming, spillway damaged.	Requires de-silting, catchment conservation, spillway redesign and construction, construction of livestock watering facilities and improved irrigation efficiency.

30	Ngii Dam	-do-	80	Functional	-do-	-do-	-do-
31	Kabuku Dam	-do-	65	Functional	-do-	-do-	-do-
32	Ngelyria Dam	Ithanga/Ithanga/Ithanga	45	Functional	-do-	-do-	-do-
33	Kirathani Dam	-do-	70	Functional	-do-	-do-	-do-
35	Mianyani Dam	-do-	30	Functional	-do-	-do-	-do-
37	Kaguku Dam	-do-	35	Functional	-do-	-do-	-do-
38	Nyanyani Dam	-do-	40	Functional	-do-	-do-	-do-
39	Siranga Dam	Kakuzi/Kakuzi/Kakuzi	55	Functional	-do-	-do-	-do-
40	Kimathi water pan	Gaturi ward in kiharu	50	Partially Functional	Livestock	Silted up,	Requires de silting
41	Githuri water pan	Mbiri ward in kiharu	15	Non functional	Dried up	Silted up,	Requires de silting
42	Upendo water pan	Mbiri ward in kiharu	20	Partially Functional	Livestock	Silted up,	Requires de silting

Appendix 2 : Elevation ranges in Murang’a County



Appendix 3: Proposed Dam sites in Murang’a County

Appendix 4 : Sanitaitaion Coverage table

	Sanitation Type	Coverage (%)
1	Main sewer	2.3
2	Septic tank	4.5
3	Cess pool	0.1
4	Improved Ventilated Pit (VIP) latrine	15.7
5	Pit latrine with a cover	71.4
6	Pit latrine without a cover	5.4
7	Biodigester	0.1
	Total	99.5 %

Appendix 5: Types of Sanitation facilities

Sub County	Type of Sanitation Coverage (%)								
	Main sewer	Septic Tank	Cess Pool	VIP Latrine	Pit latrine (Covered)	Pit latrine (Uncovered)	Bio digester	Bucket Latrine	Open Defecation
Murang'a East	16.4	7.1	0.2	11.8	55.2	8.7	0.1	0.1	0.3
Kangema	1.0	3.7	0.3	20.6	70.4	3.7	0.0	0.2	0.1
Mathioya	0.4	2.5	0.6	17.1	74.8	4.0	0.0	0.2	0.3
Kahuro	0.2	3.0	0.1	15.4	78.5	2.4	0.1	0.1	0.2
Maragua	0.6	7.0	0.1	13.6	70.7	7.2	0.1	0.2	0.5
Gatanga	0.8	4.4	0.1	16.8	70.8	6.7	0.2	0.1	0.3
Kigumo	0.5	3.6	0.1	19.4	72.7	3.4	0.1	0.1	0.1
Kandara	0.6	3.2	0.0	13.8	77.6	4.5	0.0	0.1	0.1

Source: KNBS – Kenya Population and Housing Census (2019)

Appendix 6 ;Sanitation in primary schools

Sub County	No. of schools	Type of school			Male Pupils	Female Pupils	Total No. of pupils	Male pupils with mobility challenges	Female pupils with mobility challenges	Male staff	Female staff
		ECDE	Primary & ECDE	Primary & Special Unit							
Gatanga	83	22	49	12	13,295	12,622	25,917	68	40	356	852
Ithanga	31	4	20	7	5,934	5,542	11,476	13	7	198	257
Kandara	89	16	59	14	14,475	13,682	28,157	24	21	461	869
Mathioya	75	14	48	13	8,529	8,140	16,669	11	11	389	553
Kiharu	68	11	45	12	9,592	9,112	18,704	15	12	285	555
Kahuro	59	11	38	10	6,797	6,464	13,261	27	12	207	413
Kangema	49	10	30	9	6,620	6,208	12,828	13	8	205	362
Kigumo	79	21	50	8	11,773	11,197	22,970	34	33	342	607
Maragua	106	40	50	16	15,826	15,096	30,922	80	67	505	804
Total	639	149	389	101	92,841	88,063	180,904	285	211	2,948	5,272

Appendix 7 Water Access in schools

Sub County	No. of schools	Male pupils	Female pupils	Total No. of pupils	Male staff	Female staff	Water availability	Main source of drinking water			Water testing	Sch. with water storage facilities	Sch. with adequate water	Sch. with accessible drinking water to the youngest pupils	Sch. with accessible drinking water to PWD
								Piped	Rainwater	Protected well/spring					
Gatanga	83	13,295	12,622	25,917	356	852	66	50	14	2	4	78	44	72	68
Ithanga	31	5,934	5,542	11,476	198	257	25	4	9	12	0	30	12	27	27
Kandara	89	14,475	13,682	28,157	461	869	74	44	23	7	5	85	31	75	65
Mathioya	75	8,529	8,140	16,669	389	553	66	42	20	4	2	75	43	71	61
Kiharu	68	9,592	9,112	18,704	285	555	55	35	17	3	0	64	39	62	47
Kahuro	59	6,797	6,464	13,261	207	413	52	35	17	0	2	54	39	53	41
Kangema	49	6,620	6,208	12,828	205	362	45	36	9	0	1	47	35	46	20
Kigumo	79	11,773	11,197	22,970	342	607	61	33	25	3	6	70	44	64	51
Maragua	106	15,826	15,096	30,922	505	804	77	35	30	12	3	90	39	82	67
Total	639	92,841	88,063	180,904	2,948	5,272	521	314	164	43	23	593	326	552	447

Appendix 8 Access to Sanitation

Sub County	No. of schools	Male pupils	Female pupils	Total No. of pupils	Male staff	Female staff	Boys toilets	Boys urinals	Girls toilets	Staff toilets	Schools with shared toilets	Schools with toilets accessible to PWD	Schools with toilets accessible to the youngest pupils
Gatanga	83	13,295	12,622	25,917	356	852	489	123	650	249	13	32	74
Ithanga	31	5,934	5,542	11,476	198	257	206	29	248	76	5	11	20
Kandara	89	14,475	13,682	28,157	461	869	683	97	852	264	10	18	55
Mathioya	75	8,529	8,140	16,669	389	553	572	99	614	287	9	27	49
Kiharu	68	9,592	9,112	18,704	285	555	401	52	513	205	11	33	48
Kahuro	59	6,797	6,464	13,261	207	413	363	66	366	148	13	24	49
Kangema	49	6,620	6,208	12,828	205	362	344	74	401	132	9	2	45
Kigumo	79	11,773	11,197	22,970	342	607	542	85	617	262	14	15	63
Maragua	106	15,826	15,096	30,922	505	804	705	114	784	244	19	31	80
Total	639	92,841	88,063	180,904	2,948	5,272	4,305	739	5,045	1,867	103	193	483

Appendix 9 ; Access to Hand Washing Facilities

Sub County	No. of schools	Male pupils	Female pupils	Total No. of pupils	Male staff	Female staff	No. of schools with HWFs	No. of schools providing soap for HW	No. of schools with HWFs accessible to the youngest pupils	No. of schools with HWFs accessible to pupils WD
Gatanga	83	13,295	12,622	25,917	356	852	71	22	70	65
Ithanga	31	5,934	5,542	11,476	198	257	28	11	28	28
Kandara	89	14,475	13,682	28,157	461	869	68	15	64	56
Mathioya	75	8,529	8,140	16,669	389	553	71	23	71	58
Kiharu	68	9,592	9,112	18,704	285	555	61	18	56	42
Kahuro	59	6,797	6,464	13,261	207	413	53	12	51	40
Kangema	49	6,620	6,208	12,828	205	362	44	7	43	13
Kigumo	79	11,773	11,197	22,970	342	607	60	27	57	37
Maragua	106	15,826	15,096	30,922	505	804	84	22	82	67
Total	639	92,841	88,063	180,904	2,948	5,272	540	157	522	406

Appendix 10; Menstrual Waste and Solid Waste Management data

Sub County	No. of schools	Male pupils	Female pupils	Total No. of pupils	Male staff	Female staff	Schools providing private space for MHM	Schools with MHM Infrastructure	Schools Disposing MH waste on site	Schools with SWM infrastructure	Solid Waste Disposal Method		
											Burning	Burying	Open Dumping
Gatanga	83	13,295	12,622	25,917	356	852	3	0	46	35	35	8	19
Ithanga	31	5,934	5,542	11,476	198	257	0	0	16	21	21	0	0
Kandara	89	14,475	13,682	28,157	461	869	3	0	27	41	35	4	0
Mathioya	75	8,529	8,140	16,669	389	553	1	0	28	15	11	1	3
Kiharu	68	9,592	9,112	18,704	285	555	5	0	37	29	29	11	6
Kahuro	59	6,797	6,464	13,261	207	413	0	0	34	23	21	5	1
Kangema	49	6,620	6,208	12,828	205	362	1	0	13	13	12	4	1
Kigumo	79	11,773	11,197	22,970	342	607	12	0	43	36	31	14	7
Maragua	106	15,826	15,096	30,922	505	804	7	0	42	54	49	0	1
Total	639	92,841	88,063	180,904	2,948	5,272	32	0	286	267	244	47	38

Appendix 11;: Wash in Health Care Facilities

Health Care Facility Population							Sanitation Facilities					
Sub County	No. of HCFs	No. of male outpatients - 2023	No. of female outpatients - 2023	No. of male staff	No. of female staff	HCFs with space for expansion	No. of Male staff toilets	No. of female staff toilets	No. of male patients toilets	No. of female patients toilets	No. of urinals for male patients	No. of urinals for male staff
Gatanga	17	41,832	46,423	29	67	17	2	8	14	17	6	1
Ithanga	6	17,443	31,803	45	63	6	5	7	11	12	2	1
Kandara	26	164,457	203,141	42	111	26	16	26	20	21	15	4
Mathioya	21	59,964	86,202	51	103	18	17	15	16	22	17	7
Kiharu	10	26,115	32,888	22	56	8	7	15	4	4	7	3
Kahuro	14	44,637	85,407	39	57	9	9	10	11	10	15	2
Kangema	21	30,285	47,751	40	64	19	5	10	11	11	8	5
Kigumo	20	50,406	71,843	55	116	20	16	13	16	20	11	6
Maragua	16	57,934	83,537	60	100	16	13	11	14	19	5	4
Total	151	493,073	688,995	383	737	139	90	115	117	136	86	33

Appendix 12; Water supply in HCFs

Health Care Facility Population							Water						
Sub County	No. of HCFs	No. of male outpatients - 2023	No. of female outpatients - 2023	No. of male staff	No. of female staff	HCFs with availability of water	Main source of water			Treatment of water at HCF	HCFs with water storage facilities	No. of HCFs with sufficient water	No. of HCFs with drinking water accessible to PWD
							Borehole/ well	Piped	Rainwater				
Gatanga	17	41,832	46,423	29	67	18	0	18	0	5	18	14	13
Ithanga	6	17,443	31,803	45	63	6	2	2	2	0	6	2	5
Kandara	26	164,457	203,141	42	111	26	0	21	5	5	26	22	21
Mathioya	21	59,964	86,202	51	103	20	0	12	7	6	20	18	17
Kiharu	10	26,115	32,888	22	56	10	1	6	3	4	8	8	7
Kahuro	14	44,637	85,407	39	57	12	0	9	3	5	13	10	9
Kangema	21	30,285	47,751	40	64	20	0	18	2	2	21	19	9
Kigumo	20	50,406	71,843	55	116	19	0	8	12	8	20	15	18
Maragua	16	57,934	83,537	60	100	15	1	11	3	4	16	12	12
Total	151	493,073	688,995	383	737	146	4	105	37	39	148	120	111

Appendix 13: Hand Washing Facilities

Health Care Facility Population						Hand Washing Facilities			
Sub County	No. of HCFs	No. of male outpatients - 2023	No. of female outpatients - 2023	No. of male staff	No. of female staff	No. of HCFs with only handwashing points	No. of HCFs with handwashing points with soap/sanitizer	No. of HCFs with handwashing points at the toilets	No. of HCFs with handwashing points accessible to PWD
Gatanga	17	41,832	46,423	29	67	2	16	17	11
Ithanga	6	17,443	31,803	45	63	1	5	3	5
Kandara	26	164,457	203,141	42	111	6	20	17	23
Mathioya	21	59,964	86,202	51	103	4	16	13	17
Kiharu	10	26,115	32,888	22	56	0	10	8	8
Kahuro	14	44,637	85,407	39	57	1	12	12	10
Kangema	21	30,285	47,751	40	64	5	13	12	7
Kigumo	20	50,406	71,843	55	116	4	16	17	18
Maragua	16	57,934	83,537	60	100	3	13	14	12
Total	151	493,073	688,995	383	737	26	121	113	111

Appendix 14: Health Care Waste Management

Health Care Facility Population							Management of Health Care Waste							
Sub County	No. of HCFs	No. of male outpatients - 2023	No. of female outpatients - 2023	No. of male staff	No. of female staff	No. of HCFs segregating waste	Treatment/Disposal of infectious waste							
							Autoclave	Burning in protected pit	Burning chamber	Incineration	Burying in lined, protected pit	Collected for off-site disposal	Open burning	Open dumping
Gatanga	17	41,832	46,423	29	67	17	1	2	12	0	0	1	2	0
Ithanga	6	17,443	31,803	45	63	6	0	1	2	0	0	1	2	0
Kandara	26	164,457	203,141	42	111	26	1	9	11	2	0	0	2	1
Mathioya	21	59,964	86,202	51	103	20	1	11	0	0	0	6	2	0
Kiharu	10	26,115	32,888	22	56	10	0	0	1	0	0	9	0	0
Kahuro	14	44,637	85,407	39	57	13	1	6	4	2	0	1	0	0
Kangema	21	30,285	47,751	40	64	12	1	2	3	0	0	7	8	0
Kigumo	20	50,406	71,843	55	116	20	0	10	5	0	1	2	2	0
Maragua	16	57,934	83,537	60	100	14	0	8	4	0	0	3	1	0
Total	151	493,073	688,995	383	737	138	5	49	42	4	1	30	19	1

Appendix 15. 10 Wash Water Projects for FY 2024/2025

Households accessd with water in Murang'a county April 2024 –March 2025

RE: MURANG'A COUNTY GOVERNMENT : LIST OF K-WASH PROJECTS SUBMITTED UNDER DL1 2; HOUSEHODS PROVIDED WITH ACCESS TO WATER SERVICES (NUMBER)

S/No	Sub-County	Name Of Ward	Name of Project	Number of Households provided with access to water services	Co-ordinates
2	Maragua	Nginda	Iregi- Kiendwa , Irembu -Nyerere water distibution project	60	0° ,47°2.27° S 37° ,5° ,20.03° E
		Kimorori Wempa	Mitiini –Thangira water distribution project	20	0° ,54° 48.46° S 37° ,9° , 23.91° E
		Kambiti	Mawe Mbiri- Kagioini – Manaini water distribution project	30	0° ,48° 0.90° S 37° ,7° 38.81° E
		Ichagaki	Kenton Kibiriri- water distribution project	45	0° ,48° 44.41° S 37° ,5° ,13.77° E
		Kamahuha	Gathuri-Sabasaba water distribution project	50	0° ,52° 50° S 37° ,8° , 47.13° E
4	Kandara	Ithiru	Mutiti-Gikindu- Gathugu water distribution project	60	0° ,31° 20.87° S 37° ,15° ,3.14° E
		Ruchu	Gichichi – Kamahiga water distribution projectwater distrib	50	0° ,48° 47.42° S 36° ,54° , 9.75° E
		Muruka	Mariaini – Kanjama water distribution project	50	0° ,54° 40.02° S 37° ,1° , 48.94° E
		Kagunduini	Tosheka – Mukerenju water	60	0° ,56° 47.91° S

			distribution project		37 ⁰ , 6 ^{''} , 20.04 ^{''''} E
		Ngararia	Restoration-Muirini – Restoration water distribution project	60	0 ⁰ 53 ^{''} 45.22 ^{''''} S 36 ⁰ 59 ^{''} 35.94 ^{''''} E
6	Gatanga	Gatanga	Mukarara water distribution project	40	0 ⁰ 41 ^{''} 16.39 ^{''''} S 36 ⁰ , 58 ^{''} , 39.34 ^{''''} E
		Mugumoini	Chania, Kaumburi – Kahuria water distribution project	40	0 ⁰ 57 ^{''} 9.29 ^{''''} S 36 ⁰ , 59 ^{''} , 36.94 ^{''''} E
7	Ithanga	Ithanga	Kaguku-Ithanga water distribution project	80	0 ⁰ 59 ^{''} 10.92 ^{''''} S 37 ⁰ , 22 ^{''} , 8.7 ^{''''} E
2	Kiharu	Gaturi	Giikuni-Croni-Ngirini water distribution project	55	0 ⁰ , 38 ^{''} 57.48 ^{''''} S 37 ⁰ , 3 ^{''} , 37.15 ^{''''} E
		Mbiri	Gikindu-Muti-Gathugu water distribution project	30	0 ⁰ , 39 ^{''} 17.8 ^{''''} S 37 ⁰ , 14 ^{''} , 19.72 ^{''''} E
3	Kahuro	Murarandia	Gatare-Matharite-Thengeini water distribution project	70	0 ⁰ , 42.41.96 ^{''''} S 37 ⁰ , 54 ^{''} , 34.95 ^{''''} E
		Mugoiri	Mirichu-Kahuro-Kahatia water distribution project	80	0 ⁰ , 45 ^{''} 58.05 ^{''''} S 36 ⁰ , 59 ^{''} , 32.7 ^{''''} E
5	Kigumo	Kinyona	Rwangu-Ngonga-Kanyeki Water distribution project	60	0 ⁰ 44 ^{''} 1.03 ^{''''} S 36 ⁰ , 52 ^{''} , 42.89 ^{''''} E
		Kangari	Mwarano – Njauini water distribution project	50	0 ⁰ 46 ^{''} 27.9 ^{''} 6 ^{''} S 36 ⁰ , 51 ^{''} , 5.43 ^{''''} E
		Muthithi	Ngobe –Gituri – Mbunge water distribution water	60	0 ⁰ 49 ^{''} 7.89 ^{''''} S 37 ⁰ , 1 ^{''} , 51.93 ^{''''} E

			project.		
		Kigumo	Kirere water distribution project	30	0°47' 56.56" S 36° 57' , 18.26" E
8	Kangema	Muguru	Ihiga –Githeme – Muguru water distribution project	50	0° 40' 46.99" S 37° 0' , 34.09" E
9	Mathioya	Kiru	Kaugu-Kagioini water distribution project	50	0° 36' 51.3" S 36° 57' , 3.99" E
		Gitugi	Kambara-Kanooro-Kang'ong'i water distribution project	50	0° 40' 12.1" S 37° 2' , 22.97" E
Total number of Households accessed with water				1230 Households	