REPUBLIC OF KENYA **GOVERNMENT OF MAKUENI COUNTY**

MAKUENI COUNTY WATER AND SANITATION STRATEGY AND INVESTMENT PLAN

2025-2030

MAY, 2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

FOREWORD

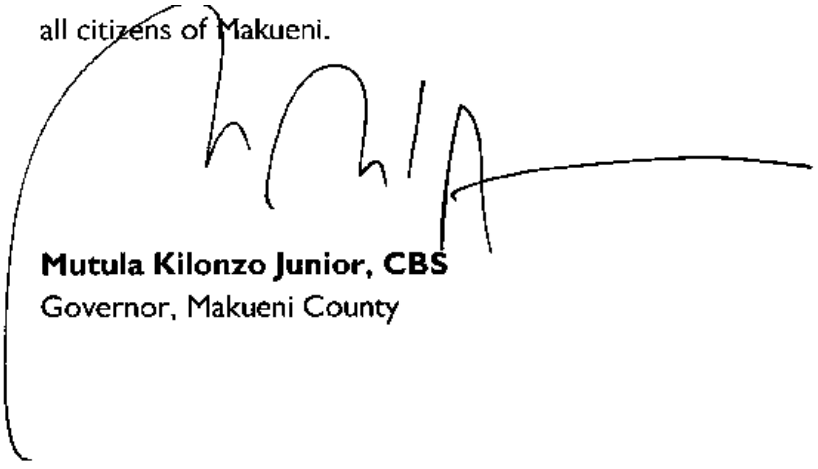
I am privileged to introduce the Makueni County Water, Sanitation, Strategy and Investment Plan (CWSSIP) 2025–2030. This plan is a historic milestone for the county since Water and sanitation are constitutional rights for all citizens and a key enabler to economic growth and development. Water and sanitation are devolved functions. Schedule IV of the Constitution gives the county governments a mandate and responsibility to ensure Kenyans enjoy their constitutional right to clean and safe water and reasonable sanitation standards. This obligation is what this plan intends to achieve.

Makueni County Water, Sanitation, Strategy and Investment Plan (CWSSIP) 2025–2030 is the first five-year county water and sanitation plan since devolution. The plan integrates strategies and aspirations from various plans, including the Sustainable Development Goals, African Union Agenda 2063, the Kenya Vision 2030, the Medium Term Plan 2023-27, the Bottom Up Transformation Agenda, and the Makueni County Integrated Development Plan 2023-27. It also aligns with the National Water and Sanitation Investment Programme (NAWASIP),2022-2030.

The development of this plan was multi-sectoral, emphasizing our belief in and desire for strategic partnerships in our development journey. Through these strategic partnerships, innovative solutions, and a commitment to environmental stewardship, we aim to create a model for sustainable water and sanitation delivery services.

The Programmes, Strategies, and Indicators set in this plan are driven by data. Baseline data for Water and Sanitation and Hygiene (WASH) service delivery were collected and analyzed to inform the formulation of this Plan. The plan, therefore, contains evidence-based investments from the identified priority interventions and highlights the facilitating reforms required to enhance the service delivery in the Water, Sanitation, and Hygiene (WASH) sector.

I thank you all for your commitment to the betterment of our beloved county and reiterate the responsibility of my government to support and address the needs of the people of Makueni. This plan is a testament to our dedication to providing potable water and a reasonable standard of sanitation for all citizens of Makueni.



Mutula Kilonzo Junior, CBS
Governor, Makueni County

PREFACE

The constitution of Kenya 2010 enshrines access to clean and safe water in adequate quantities and reasonable standards of sanitation as fundamental rights of all Kenyans[1]. Deprivation of these rights derails all other economy sectors. The County Government of Makueni has continuously prioritized water and sanitation with little success due to various factors, including inadequate financial resources, climate change challenges, and water governance, among others. This makes the need for a strategic long-term investment plan for Water and sanitation very critical.

The Makueni County Water and Sanitation Strategy and Investment Plan presents a comprehensive action-oriented solution to the mentioned challenges for the county. It offers strategic direction to the policymakers, the community, and Development partners toward resilient, equitable, and efficient water and sanitation systems. The plan, developed in collaboratively by National and County government technical officers, World Bank's technical expertise, and Stakeholders' consultations, reflects an evidence-based analysis on water and sanitation services across the county.

Access to running water and improved sanitation is key to unlocking economic growth for both individuals and the wider society. The strategy assesses the Water and WASH access in the county, with schools and public health facilities as the entry point. The simple act of handwashing with soap yields an immediate and positive impact on public health, reducing the incidences of sickness, hence minimal work or school absenteeism, both of which come at great personal and institutional economic cost. Enhanced access to water and sanitation in schools has a twofold advantage. It enables consistent and safe school attendance by the learners, while nurturing them as agents of change through proper knowledge transfer. Through knowledge sharing on best practices in their families, they instill new behaviors in their communities. This transformation mentors a future generation of qualified adults in water, sanitation, and hygiene services, thereby making schools an ideal entry for good public health practices.

The plan looks at the infrastructure and the service delivery component of water and WASH, analyzes them to identify gaps and inadequacies, and develops innovative solutions to address them. Water governance is a prerequisite to improve resilience and the ability of the county and community at the lower decentralized level to better manage climate-related and other risks. A truly inclusive governance is an important component in ensuring the sustainability of the water and sanitation systems. The plan looks at the governance and institutional capacity of both water and sanitation systems as an important component in the value chain, and provides ways to strengthen water and sanitation institutions.

On gender equality, access to water is at the heart of achieving gender parity. Women and girls are disproportionately affected by water insecurity as they are often responsible for household water needs. They are also likely to suffer from gender-based violence arising from water insecurity as they travel to far areas in search of water. Makueni is an ASAL agricultural county that requires enhancing its irrigation component toward food security and enhanced livelihoods. Most of the small-scale farmers in the rural areas are women. The plan, therefore, looks at providing equal access to water and sanitation services,

[1] Constitution of Kenya 2010

as well as gender transformative leadership at every water and sanitation decision-making level to ensure we end the disproportionate risk that women and girls face.

Overall, the strategy emphasizes accessibility, sustainability, inclusiveness, and innovation, aligning with broader development goals and environmental commitments. I appreciated the leadership of the County government of Makueni, led by H.E. Mutula Kilonzo Junior, CBS, H.E. Lucy Mulili, all CECMs, and the Chief Officers, for your unwavering support in developing this strategy. My sincere thanks to the Technical team: the government engineers, medical officers, public health specialists, economists, and environmental experts, both at the county and national levels, whose work and insights shaped this strategy. Special mention to our Consultant and the World Bank for their expert support and backstopping. I hope this document serves as both a roadmap and a call to action for meaningful and timely investment in our most precious resource, and will put the county on track toward achieving the set outcome in Water and Sanitation access.

Eng. John K. Kieti
County Executive Committee Member
Water, Sanitation and Irrigation

Dr. Paul Musila
County Executive Committee Member
Health Services

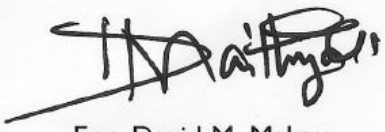
ACKNOWLEDGEMENT

The preparation of the County Water and Sanitation Strategy and Investment Plan (CWSSIP) 2025 – 2030 and its Investment Plan benefitted immensely from collective effort by various stakeholders. The participatory and all-inclusive approach adopted in its preparation ensured wide participation, consultation, discussion and consensus building toward the final plan.

Special appreciation goes to the County Executive Committee led by H.E. the Governor, Mutula Kilonzo Junior and H.E. the Deputy Governor, Lucy Mulili, County Secretary, and all Executive Committee Members for providing the overall leadership and guidance during the plan development. I also wish to appreciate the County Chief Officers who continually provided support and guidance to the process. The work on the plan was underpinned by a series of primary data collection activities, secondary data review and consolidation and inter-sectoral working sessions.

The drafting team was spearheaded by the County Project Implementation Unit (CIPU) led by the K-WASH taskforce. The core team members included; Carolyne N. Vita – K-WASH Coordinator, Dr. Stephen Mwatha, Eng. Daniel Mututa, Elizabeth Katenge, Eng. Dominic Kiwia, Joshua Mutuku, Alphonce Mutinda, Benedict Muma, Stanlus Matheka, Jeremiah Mutunga, Hastings Mwangangi, Kevin Mutua, Faith Mwende, Mark Mulinge, Shadrack Muthiani, Stephen Munyao and Aaron Mwendwa. I also want to appreciate the Sub County Water Engineers, Ward Water Officers and All County Public Health Officers for their self-less effort in coordinating data collection and collation and reports writing in their specific jurisdictions.

We gratefully acknowledge Makueni County Statistician-Kenya National Bureau of Statistics (KNBS), County Water Service Providers (KIBMAWASCO, WOWASCO and MBONWASCO) and USAID-STAWI for their invaluable support towards ensuring the document is well planned and strategized to reflect the aspirations and desires of the people of Makueni county.



Eng. David M. Makau
Chief Officer Water, Sanitation and Irrigation

Dr. Geoffrey N. Muthoka
Ag. Chief Officer Health Services

EXECUTIVE SUMMARY

Overview

Makueni County's Water and Sanitation Strategy addresses numerous challenges in effectively utilizing resources and expanding access to critical water and sanitation services. The document highlights inefficiencies in budget absorption arising from limited own-source revenue, heavy dependence on donor funding, poor governance, delays in project implementation, and maintenance challenges. These factors have not only hindered the efficient allocation of funds but also impeded the long-term sustainability of water resources and infrastructure.

The strategy is structured into seven chapters as follows:

Chapter One: This chapter provides a comprehensive overview of Makueni County's socio-economic, political and water resource context, establishing the foundation for strategic interventions in water, sanitation and economic development. It details the county's geographic and demographic profile, governance structures, policy frameworks, and the critical role of water in driving socio-economic growth. At the same time, it identifies key challenges, including climate variability, infrastructural inadequacies and regulatory constraints that currently impede sustainable water service delivery.

The chapter further outlines the robust governance architecture that underpins water and sanitation service delivery in Makueni County. Operating within the constitutional framework of Kenya including the Constitution of 2010 and complementary legislation such as the Water Act 2016 and the Makueni County Water Act, 2020, water is positioned as a cornerstone for economic development in Makueni County. Although the direct contribution of water supply to the Gross County Product (GCP) is modest (approximately 0.6%), its indirect impact on agriculture, industry, domestic life and public health is profound.

Chapter Two: The chapter provides a comprehensive analysis of the Water, Sanitation, and Hygiene (WASH) services coverage in Makueni County. It examines the county's available water resources, the status and gaps in water supply and sanitation infrastructure and the effects of seasonal and climate-related challenges on service delivery. The chapter also explores the performance of urban versus rural services, the state of WASH in schools and healthcare facilities, and the potential of Multiple Use Water Services (MUS) as an integrated strategy for sustainable resource management.

Makueni County is endowed with a diverse mix of water sources in the county that include groundwater (boreholes and shallow wells), surface water (rivers, dams, water pans, and springs) as well as rainfall. The county's estimated daily water production capacity is approximately 41,522 M^3 under normal conditions, though it can drop to about 33,366 M^3 during dry seasons due to the reduced yields from water pans and dams. Despite this wealth, rising water demand from current estimates of around 65,664 M^3/day up to 75,265 M^3/day in 2030 creates a significant daily water deficit that stresses the existing infrastructure.

On the sanitation front, access to improved facilities remains a challenge. While open defecation rates are low, many households and institutions are served by shared or limited sanitation solutions. Aging infrastructure, poor fecal sludge management, and inadequate maintenance compound the challenges in both rural and urban settings. Social and gender dimensions are also critical, as women disproportionately shoulder water collection duties and often face insufficient menstrual hygiene management (MHM) facilities.

The chapter also evaluates WASH service delivery in critical public institutions. While most schools and healthcare facilities have some form of water and sanitation infrastructure, significant gaps persist in terms of safe, basic and hygienic service levels. For instance, nearly 71% of schools have year-round water access, yet a notable share still relies on irregular supplies. Similarly, only about 49% of healthcare facilities receive consistent water supply. In both sectors, issues such as insufficient sanitation facilities, inadequate handwashing stations, and limited menstrual hygiene management exacerbate health risks and may affect educational and health outcomes.

Chapter Three: The chapter examines the institutional structure and financing of water and sanitation services in Makueni County. It outlines the governance frameworks that guide service delivery and provides an in-depth analysis of funding sources, revenue generation models and the challenges faced in ensuring long-term financial sustainability. It is evident that Water, Sanitation, and Hygiene (WASH) interventions in Makueni County are predominantly financed through public sources augmented by critical support from development partners. Over the five-year span from FY 2020/21 to FY 2024/25, the county has provided approximately KES 4.5 billion while non-state actors contributed around KES 1.63 billion. Although partnership support has been essential, these combined resources are falling increasingly short of the rapidly growing infrastructure and service needs.

The financing framework reveals a heavy reliance on county budget allocations, accounting for roughly 73.5% of total funding with the remaining 26.5% coming from development partners such as Water Mission, Africa Sand Dam Foundation, World Vision, Welthungerhilfe, USAID STAWI, Kenya Red-cross, Project Maji, JICA, and the Turner Foundation. Despite this blend of funding, the county's allocations have decreased over the analyzed period (from KES 1,125.36 million in 2020/21 to KES 638.44 million in 2024/25), while resource requirements set out in strategic development plans (CIDP II and III) increased from KES 2.5 billion to KES 7.22 billion. Consequently, the funding gap widened markedly, from 864.43 million in 2020/21 (a 35% shortfall) to 5.87 billion in 2024/25 (an 81% shortfall).

In pursuit of attaining universal access to water and sanitation, the county would need to implement water, sanitation and hygiene programs and projects valued at approximately KES 19.55 billion, translating to an annual investment of around KES 3.2 billion over the next six years. Recognizing the need to supplement public financing, the plan underscores the potential of public-private partnerships (PPPs) in enhancing service delivery. New legislative provisions, such as those in the recently amended Water (Amendment) Act 2023, will facilitate private sector participation in the financing, development and management of water infrastructure. Additionally, the chapter points to blended finance models and innovative funding mechanisms.

Chapter Four: The chapter examines planning scenarios and investment opportunities aimed at achieving county-wide universal access to water, sanitation, and hygiene (WASH) services in Makueni

County. The chapter reviews historic expenditure trends, highlights inefficiencies in resource utilization, and assesses the relationship between financial investment and service delivery improvements. It then projects future service demand driven by population growth, urbanization, and climate change, before outlining the comprehensive reforms and investment needs required to close existing service gaps.

An analysis of past funding shows that between 2022 and 2024, budget allocations for the WASH sector consistently exceeded actual expenditures. For instance, in 2022 only 70% of the allocated KES 779.36 million was spent – with capital investments in water supply executing at just 61% - while operational spending for non-sewered sanitation achieved full utilization. By 2023, overall budget execution improved to 77%, with capital spending rising to 72% for the water segment and strong operational performance across both water and sanitation. Nevertheless, the chapter identifies critical challenges such as slow capital absorption, inefficiencies in project planning and procurement, and an over-reliance on donor funding and transfers from the National Treasury. These factors, compounded by weak law enforcement and limited own-source revenue, hinder the county's ability to optimize its resources and sustainably expand critical infrastructure.

The chapter highlights the positive outcomes of sustained sector investments. Initiatives like "*Kutwiikany'a Kiw'u*" and the last-mile water connectivity program (*Kunyaaikya Kiw'u Nduani na Misyini*) have led to marked improvements in water access – evidenced by an increase in potable water access from 35.6% in 2013 to 44.2% in 2019 – and a reduction in the average distance to water sources from 8 km to 4 km by 2024. Similarly, investments in sanitation infrastructure have contributed to better public health outcomes by reducing the incidence of waterborne diseases and freeing up resources for other essential services. Financial inputs have proven essential for these transformative changes, even as the sector continues to face structural challenges that impede full capital execution.

Looking ahead, demographic shifts, accelerated urbanization and the impacts of climate change are collectively set to drive up the demand for WASH services. Projections indicate that Makueni's water demand will rise from approximately 65,664 m^3/day in 2024 to 75,266 m^3/day by 2030, while the current production capacity remains relatively static (dropping during dry periods to about 33,366 m^3/day).

To bridge these gaps, the plan recommends a multi-pronged strategy that combines substantial infrastructure investments with targeted policy and institutional reforms. It calls for infrastructure development, institutional and policy reforms and integrated planning.

Chapter Five: The chapter outlines a comprehensive Sector Investment Plan for water, sanitation, and hygiene (WASH) services in Makueni County. The chapter sets the strategic vision and priorities aligned with Kenya Vision 2030, the county's Integrated Development Plan (CIDP 2023–2027), national financing plans (NAWASIP), and the Sustainable Development Goal 6 agenda. It proposes robust institutional reforms, infrastructure investments, and innovative financing methods to achieve universal, equitable, and climate-resilient WASH access throughout the county.

The long-term goal is to ensure that all residents have 100% access to safe water and basic sanitation, contributing to improved public health, economic productivity, and overall quality of life.

Chapter Six: The chapter provides a comprehensive environmental and social assessment of Makueni County's Water, Sanitation, and Hygiene (WASH) sector. The chapter identifies significant environmental, health, and safety risks arising from both natural and human-induced factors. Key

environmental challenges include the degradation and pollution of water sources caused by unsustainable land use, deforestation, encroachment, and even oil spill incidents. Seasonal droughts, erratic rainfall, and flash floods further exacerbate water scarcity and contamination, while poorly planned or inadequately protected sanitation facilities heighten the risk of environmental degradation.

On the health and safety front, the assessment documents serious public health risks, including waterborne diseases such as cholera, typhoid, and diarrhea, as well as vector-borne illnesses like malaria stemming from inadequate water quality and compromised sanitation infrastructure. The chapter also outlines safety concerns related to construction site hazards, damage from flooding, and human – wildlife conflicts – issues that not only undermine infrastructure reliability but also expose communities (especially women and children) to dangers during long walks to fetch water.

Socially, the WASH sector's shortcomings are compounded by gender and vulnerability dimensions. Women and girls disproportionately bear the burden of water collection, often facing heightened risks of gender-based violence, harassment, and heat stress. Additionally, inadequate and poorly designed sanitation facilities limit privacy and safety for vulnerable groups, including persons with disabilities and the elderly. The analysis shows that conflicts over scarce water resources, challenges with land ownership, and insecure tenure further hinder equitable service delivery and community participation. The chapter stresses that an integrated approach to land acquisition and culturally sensitive planning are crucial to preventing disputes and ensuring the fair implementation of WASH initiatives.

To manage and mitigate these diverse risks, the chapter outlines a suite of measures:

- **Environmental Mitigation:** Strategies such as afforestation, sustainable land management, proper solid waste management, catchment protection, and the construction of silt traps are recommended to reduce pollution and safeguard water resources.
- **Health and Safety Interventions:** The installation and rigorous maintenance of water treatment components, sanitation infrastructure upgrades, regular water quality monitoring, and strict adherence to occupational health and safety standards (including the provision of personal protective equipment and safety training) are critical.
- **Social and Institutional Measures:** Enhancing community engagement through grievance redress mechanisms, establishing clear protocols for land acquisition with fair compensation and resettlement, and integrating gender-sensitive planning into design and implementation processes are vital to address social vulnerabilities. The chapter also recommends the formal establishment of an integrated Environmental and Social Safeguards Unit tasked with coordinating, monitoring, and reporting on these issues.

Chapter Seven: The chapter details the comprehensive implementation roadmap, monitoring and evaluation (M&E) plan, and communication and advocacy strategy for the Makueni County Water and Sanitation Strategy and Investment Plan (CWSSIP). Designed to achieve universal, equitable, and climate-resilient access to water, sanitation, and hygiene (WASH) services, the chapter outlines a step-by-step action plan that spans eight financial years – from early 2024 through mid-2031 – and aligns with County Vision 2025, the 2023–27 CIDP, Kenya Vision 2030 and Sustainable Development Goal 6.

Implementation Roadmap: The plan is structured in three distinct phases:

- **Phase I (Short-Term: FY 2023/24–2024/25):** This initial phase emphasizes the formulation of the strategy and the collection of baseline data. The primary deliverables include a

comprehensive baseline survey report and the formal approval of the CWSSIP. Although only a limited number of WASH projects are implemented in this phase, funding is secured from both the county budget and development partners, laying the groundwork for subsequent investments.

- **Phase II (Medium-Term: FY 2025/26–2027/28):** Representing the primary implementation stage, this phase focuses on major infrastructure development and systems integration. Key outputs include:
    - Increasing the proportion of households with access to safe water from 44.2% in 2023 to 72% by June 2028.
    - Reducing the average distance to the nearest water source from 5 km to 2 km.
    - Elevating sanitation and hygiene standards in schools to 50%.
    - Declaring 3,500 villages as open defecation free (ODF) and conducting 60,000 community awareness campaigns. Major projects include the construction of mega dams, concrete dam water pipelines, and extensive last-mile water connectivity interventions—enabling new pipelines of over 1,000 kms to reach 45,000 households.
- **Phase III (Long-Term: FY 2028/29–2030/31):** In the final phase, the focus shifts to sustainability, innovation, and meeting the remaining global and national targets (e.g., achieving full universal access and completing urban sewerage facilities). This phase involves further infrastructure advancements, public-private partnerships (PPPs) for bulk water supply, and the adoption of water-efficient technologies—ultimately reaching universal access to improved WASH services in every household, health facility, and school.

A detailed implementation schedule is provided in a table that specifies key milestones, target beneficiaries, and estimated budgets at each phase, ensuring accountability and clear progress benchmarks for the county's WASH agenda.

LIST OF ACRONYMS

ACA	Athi Catchment Area
ADPs	Annual Development Plans
AIDS	Acquired Immune Deficiency Syndrome
AMCOW	African Union and The African Ministers' Council On Water
ASAL	Arid and Semi-Arid Lands
AWPS	Ariel Work Plans
BWRC	Basin Water Resource Committees
CBOs	Community-Based Organizations
CBS	Chief Of The Order Of The Burning Spear
CCCF	County Climate Change Fund
CCU	Climate Change Unit
CDD	Community-Driven Development
CEC	County Executive Committee
CECMs	County Executive Committee Members
CFAs	Community Forest Associations
CFU	Composite Filtration Unit
CHAS	Contractors Health And Safety Assessment Scheme
CHAST	Children's Hygiene And Sanitation Training
CHMT	County Health Management Team
CHPs	Community Health Promoters
CIDP	County Integrated Development Plan
CIMES	County Integrated Monitoring And Evaluation System
CIS	Climate Information Services
CLD	Community-Led Development
CLTS	Community-Led Total Sanitation
COMEC	County Monitoring And Evaluation Committee
COVID	Corona Virus Disease
CPIU	County Project Implementation Unit
CRMR	County Results Monitoring Report
CSOs	Civil Society Organizations
CTTIs	County Technical Training Institutes
CWIS	Citywide Inclusive Sanitation
CWSSIP	County Water, Sanitation, Strategy And Investment Plan
DMAs	District Metered Areas
DRMU	Disaster Risk Management Unit
DTF	Decentralized Treatment Facility
EAC	East African Community
ECD	Early Childhood Development
ECDE	Early Childhood Development Education
EHS	Environmental Health And Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management And Coordination Act
ENNCA	Ewaso Ng'iro North Catchment Area
ESAWAS	Enabling Safe, Equitable, And Sustainable Sanitation Services
ESHS	Environmental Social Health And Safety
ESIA	Environmental And Social Impact Assessment
ESMP	Environmental Social Monitoring Plan
FBOs	Faith-Based Organizations
FLLOCA	Financing Locally Led Climate Action
FOLAREP	Forest And Landscape Restoration Implementation Plan
FSD	Full Self Drive

FY	Financial Year
GCP	Gross County Product
GDP	Gross Domestic Product
GIS	Geographical Information System
GoK	Government Of Kenya
GRM	Grievance Redress Mechanism
H.E.	His Excellency
HCF	Health Care Facility
HH	Household
HIV	Human Immunodeficiency Virus
ICT	Information And Communication Technology
IDF	International Day Of Forests
IMT	Integrity Management Tool
IPC	Infection Prevention And Control
IWRM	Integrated Water Resource Management
IWUAs	Irrigation Water Users' Associations
JICA	Japan International Cooperation Agency
JMP	Monitoring Programme
KBS	Kenya Bureau Of Standards
KDHS	Kenya Demographic And Health Survey
KDSP	Kenya Devolution Support Program
KEFRI	Kenya Forestry Research Institute
KFS	Kenya Forest Service
KIBMAWASCO	Kibwezi – Makindu Water and Sanitation Company Limited
KIWASH	Kenya Integrated Water, Sanitation, And Hygiene
KPHC	Kenya Population And Housing Census
KWI	Kenya Water Institute
KWS	Kenya Wildlife Service
LPG	Liquefied Petroleum Gas
LVNCA	Lake Victoria North Catchment Area
LVSCA	Lake Victoria South Catchment Area
M&E	Monitoring& Evaluation
MARUWAB	Makueni Rural Water Board
MBOCFOA	Mbooni Community Forest Association
MBONWASCO	Mbooni Water and Sanitation Company Limited
MCAs	Members of the County Assembly
MEARL	Monitoring, Evaluation, Accountability, Reporting and Learning
MHM	Menstrual Hygiene Management
MOWSI	Ministry of Water, Sanitation and Irrigation
MoWSI	Ministry of Water, Sanitation, and Irrigation
MTPs	Medium-Term Plans
MUS	Multiple Use Water Services
NAWASIP	National Water and Sanitation Investment and Financing Plan
NBS	Nature-Based Solutions
NCDs	Nationally Determined Contributions
NDMA	National Drought Management Authority
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NIB	National Irrigation Board
NPIU	National Project Implementation Unit
NRW	Non-revenue Water
NWSA	National Water Storage Authority

NZEs	Net Zero Emissions
O&M	Operation and Maintenance
ODF	Open Defecation Free
OHS	Occupational Health and Safety
PCRA	Participatory Climate Risk Assessment
PEF	Program Expenditure Framework
PHOs	Physician Hospital Organizations
PPEs	Personal Protective Equipment
PPIs	Potential of Public-Private Partnerships
PPP	Public Private Partnership
PWDs	Peoples With Disability
RAP	Resettlement Action Plan
ROAM	Restoration Opportunities Assessment Methodology
RUSH	Rural Urban Sanitation and Hygiene
RUWASCO	Rural Water Management Solutions
RVCA	Rift Valley Catchment Area
SCOMEC	Sub-County Monitoring and Evaluation Committee
SDGs	Sustainable Development Goal s
SDMs	Service Delivery Models
SEKEB	South Eastern Kenya Block
SEP	Stakeholder Engagement Plan
SMEC	Sector Monitoring and Evaluation Committees
SMOSS	Safely Managed On-Site Sanitation
STAWI	Sustainable Transformational And Accessible Water Interventions
SWGs	Sector Working Groups
TARDA	Tana and Athi Rivers Development Authority
TCA	Tana Catchment Area
UN	United Nation
UNICEF	United Nations Children's Fund
USAID	United State Agency for International Development
WAB	Water Appeal Board
WASH	Water and Sanitation and Hygiene
WASREB	Water Services Regulatory Board
WED	World Environment Day
WHH	Welt Hunger Hilfe
WHO	World Health Organization
WMEC	Ward Monitoring and Evaluation Committee
WOWASCO	Wote Water and Sewerage Company Limited
WRA	Water Resources Authority
WRI	World Resource Institute
WRMA	Water Resource Management Authority
WSPs	Water Service Providers
WSTF	Water Sector Trust Fund
WTP	Willingness to Pay
WUAs	Water User Associations
WWDAs	Water Works Development Agencies

1.0. COUNTY SOCIO-ECONOMIC AND POLITICAL CONTEXT

1.1 Socio-Political and Administrative Background

1.1.1 Overview of county's geographic, demographic and economic context

Geographical Location and Demography

Makueni County is one of the 47 Counties in Kenya located in southeastern Kenya. It borders Kitui County to the east, Machakos County to the north, Kajiado County to the west, and Taita-Taveta County to the south. Geographically, it's situated in the semi-arid region of Kenya, characterized by low rainfall and high temperatures. The county lies between Latitude 1° 35′ and 3° 00′ South and Longitude 37°10′ and 38°30′ East with an area of 8,176.7 Km².

Makueni County is divided into six sub-counties: Makueni, Mbooni, Kaiti, Kibwezi East, Kibwezi West and Kilome. These sub-counties are further divided into 30 wards. Table 1 below shows Wards in each sub-county:

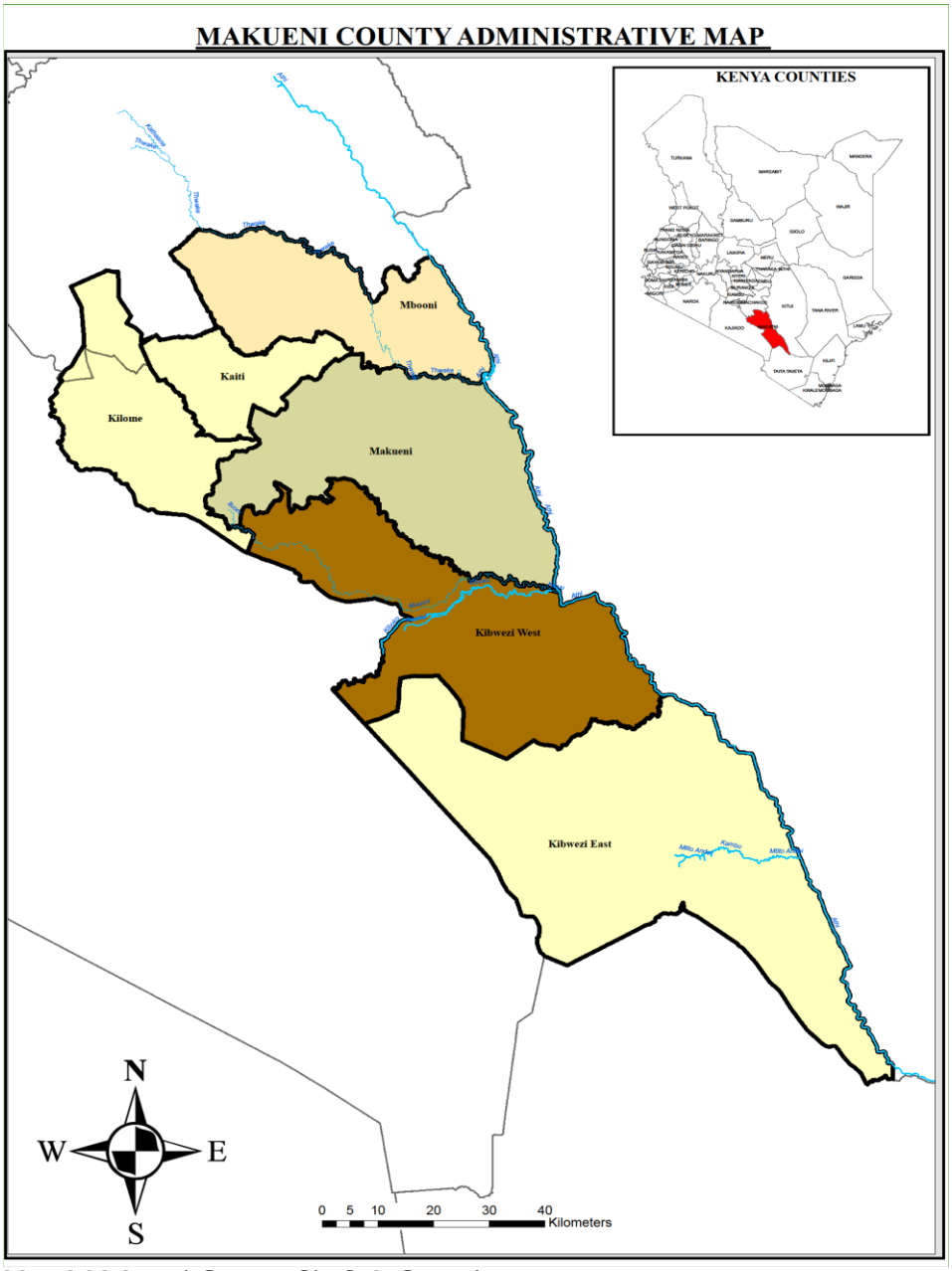
Table 1: Summary of Current Sub Counties and Wards in Makueni County

County	Sub-County	Wards		No. of Villages
		No.	Name	
Makueni	**Makueni**	7	Nzaui/Kalamba, Muvau, Kathonzweni, Mavindini, Kitise/Kithuki, Wote, Mbitini	951
	Mbooni	6	Tulimani, Mbooni, Kithungo, Kisau/Kiteta, Kako/Waia, Kalawa	615
	Kaiti	4	Kee, Kilungu, Ilima, Ukia	375
	Kibwezi East	4	Masongaleni, Mtito Andei, Thange, Ivingoni	603
	Kibwezi West	6	Makindu, Kikumbulyu North, Kikumbulyu South, Nguumo, Nguu/Masumba, Emali/Mulala	696
	Kilome	3	Kiima Kiu/Kalanzoni, Mukaa, Kasikeu	403
Total		**30**		**3,643**

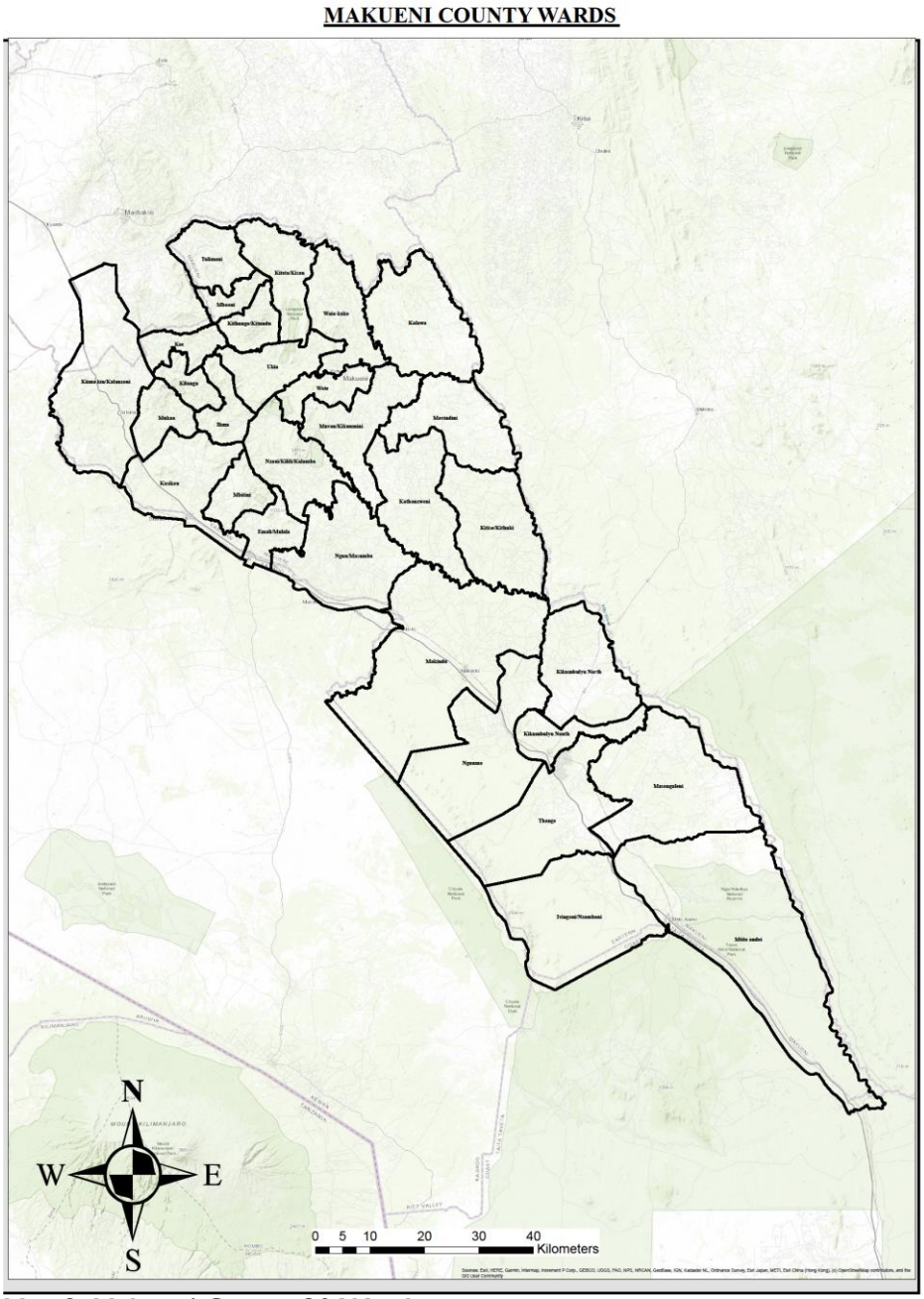
Source: Makueni County Statistical Abstract,2024

The county is a member of the South Eastern Kenya Block (SEKEB) alongside Kitui and Machakos County. Makueni county headquarters are situated at Wote town which hosts both the County Government of Makueni head offices and the National Government County Offices.

The location and administrative boundaries of the 6 Sub counties and 30 wards is as depicted in the Map1 and 2.



Map 1:Makueni County Six Sub Counties



Map 2: Makueni County 30 Wards

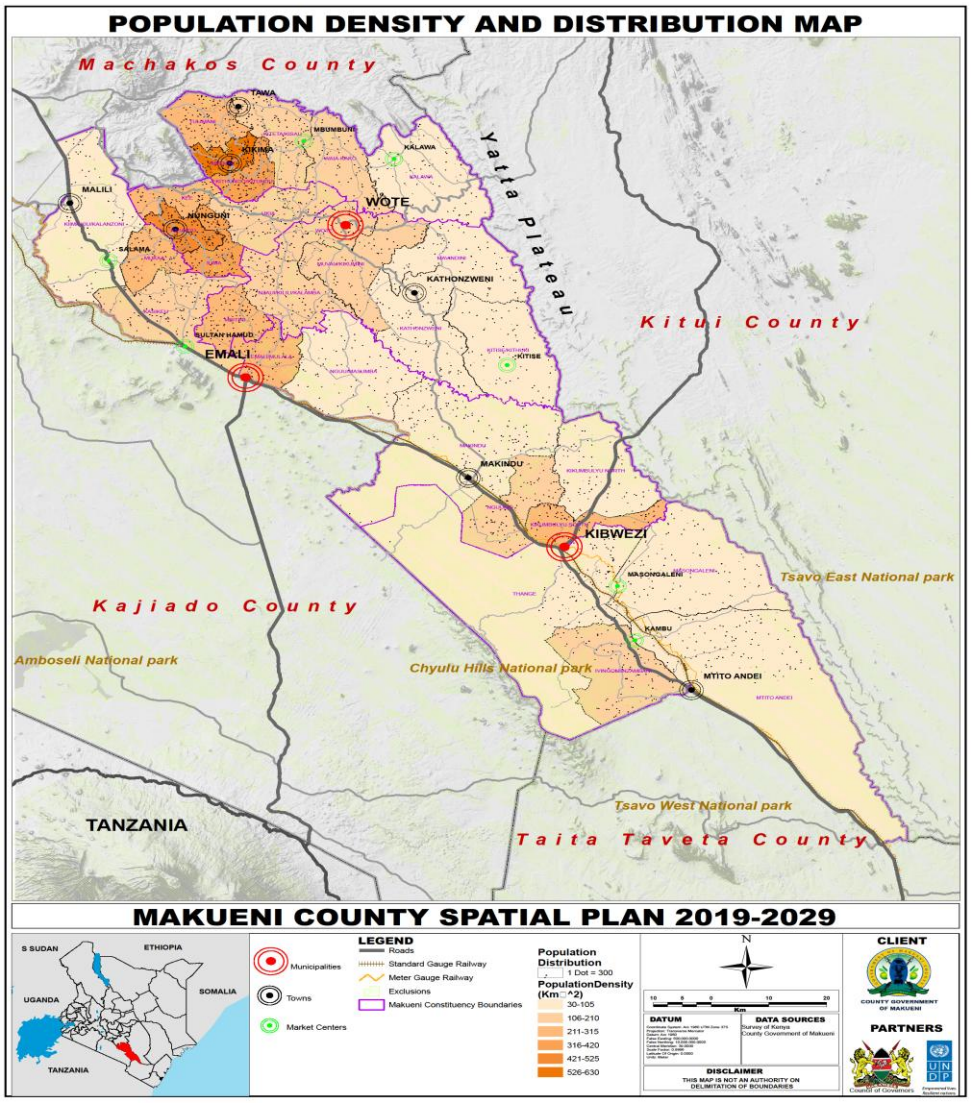
Population and Population Density

According to the 2019 Kenya Population and Housing Census (KPHC), Makueni County recorded a population of 987,653, representing approximately 2.08% of the national population. The 2019 population density is approximately 121 people per km². Based on projections from the 2019 KPHC Population Projections Report, the population of Makueni is expected to grow by 13.5% to 1,121,214 people by the year 2030, comprising 549,825 males and 571,389 females. Table 2 below provides a summary of the county's administrative units, land area, and population as per the 2019 Census.

Table 2:Administrative Units and Population of Makueni County as of 2019 based on the KPHC

Sub-County	2019 (Census)					2030 (Population Projection)				
	Male	Female	Population	Area (KM^2)	Density	Male	Female	Total	Area (KM^2)	Density
Kathonzweni	39,335	40,442	79,780	880.7	91	44,003	46,568	90,571	880.7	103
Kibwezi	98,477	98,517	197,000	3137.4	63	111,048	112,588	223,636	3137.4	71
Kilungu	29,019	31,932	60,952	154.3	395	32,307	36,892	69,199	154.3	448
Makindu	42,204	42,742	84,946	852.1	100	47,254	49,178	96,432	852.1	113
Makueni	65,418	64,955	130,375	609.3	214	73,570	74,433	148,003	609.3	243
Mbooni East	48,152	49,601	97,756	693.3	141	53,996	56,979	110,975	693.3	160
Mbooni West	49,434	53,159	102,594	270.7	379	55,450	61,023	116,473	270.7	430
Mukaa	54,481	53,068	107,549	803.7	134	61,173	60,917	122,090	803.7	152
Nzaui	63,171	63,526	126,701	775.2	163	71,024	72,811	143,835	775.2	186
County Total/ Average	**489,691**	**497,942**	**987,653**	**8,176.70**	**121**	**549,825**	**571,389**	**1,121,214**	**8,176.70**	**137**

Table 2 shows the population distribution and density and their projections per sub county. Kilungu sub county has the highest population density followed by Mbooni west sub county. This can be attributed to their location in the highlands of Makueni County whose climate and fertile soils are suitable for agriculture. Kibwezi sub county has the lowest population density. The low population density can be linked to the presence of Tsavo East National Park which limits human habitation. The population density is depicted in Map 3.



Map 3: Population Density Distribution of Makueni County

Population Trend

According to the 2019 Kenya Population and Housing Census (KPHC), Makueni County recorded a population of 987,653 people, marking a growth 11% from 884,527 in 2009. During the same period, the number of households rose significantly from 186,478 to 244,669 representing a growth of 31%. The significant increase in population and household numbers over the ten-year period indicates a growing demand for essential public services such as water and sanitation, healthcare, education, and infrastructure development. As of 2025, population projections estimate that the county is home to 1,065,482 people, comprising 523,752 males and 541,730 females.

Table 3 below summarizes the population trend by Sex, Number of Households, and average household size based on 2019 KPHC.

Table 3:Population Trend by Sex, Number of Households and Average Household Size

Census Year	Male	Female	Intersex	Total	HHs	Av. HH Size	Approx. Area (km²)	Density (Persons / km²)
1979	241,194	256,227	-	497,421	88,664	5.6	-	61.0
1989	304,654	332,171	-	636,825	104,332	6.1	7,437.0	85.6
1999	372,639	398,906	-	771,545	144,320	5.3	7,965.8	96.9
2009	430,708	453,819	-	884,527	186,478	4.7	8,008.8	110.4
2019	489,691	497,942	20	987,653	244,669	4.0	8,176.7	120.8

Urban and Rural Areas Population, 2019

Approximately 92% of the population (i.e., 910,577 people) in Makueni County resides in the rural areas as depicted in *Table 4* below.

Table 4:Summary of Population Distribution and Density within Urban and Rural Area in Makueni County

Level	Total Population	Households	Land Area (km2)	Population Density, persons per km²
County	987,653	244,669	8,177	121
Rural	910,577	217,610	8,111	112
Urban	77,076	27,059	65	1,177

A total of 27,059 which is 11% of the households are in urban areas while 89% (217,610) are in rural areas as shown below; Makueni County has 9 urban areas, with the population ranging from 19,725 to 2,266 persons as indicated in Table 5 below.

Table 5: Urban Areas in Makueni County

No.	Urban Area	Population
1.	Wote	19,725
2.	Emali	18,325
3.	Makindu	15,038
4.	Sultan Hamud	8,713
5.	Kibwezi	8,143
6.	Mtito Andei	5,626
7.	Kikima	3,269
8.	Kiboko	2,708
9.	Nunguni	2,266
Total*		**83,818**

**The total urban population shown above contains figures for Kajiado County considering that Emali and Sultan Hamud are border towns.*

Approximately 11% (26,914) of the households are in urban areas while 89% (217,755) are in rural areas as shown below;

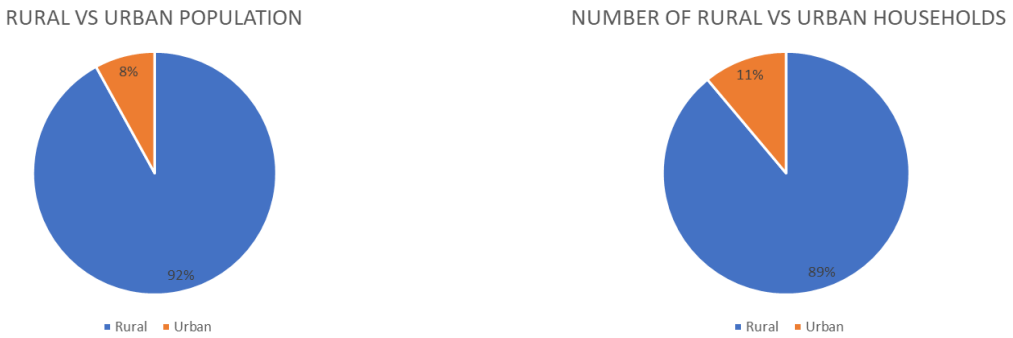


Figure 1: Population Distribution and Households in Urban and Rural Area

Population Pyramid

The population pyramid represents the age structure across various Age groups and genders according to the projected 2025 population.

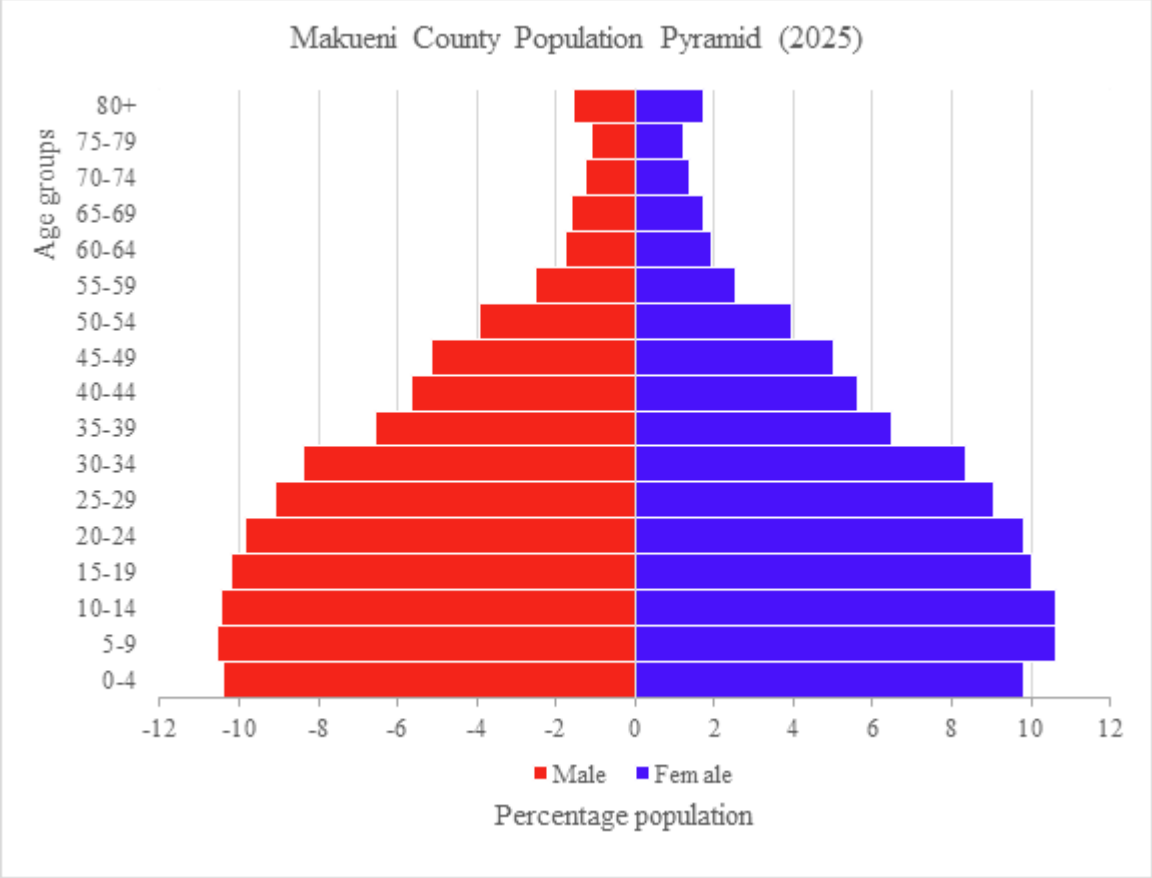


Figure 2:Makueni County Population Pyramid,2025
Source: KPHC Census Analytical report on Population Projections

The population pyramid for Makueni County in 2025 shows a significant demographic dividend potential with a large youthful population poised to enter the workforce. Strategic investments in education,

health, job creation, and youth empowerment are essential to harness this potential and drive sustainable economic growth.

Physical Geography

Physical and Topographic Features

Makueni county sits at an average altitude of 1,250Ms Above Sea Level with the lowest point measuring 600Ms while the highest point standing at 1,900Ms Above Sea Level. The major physical features in the county include the volcanic Chyullu hills which lie along the South West border of the county in Kibwezi East and West sub-counties; Mbooni hills in Mbooni sub-county which host Mbooni north and south forests and Kilungu and Iuani hills in Kaiti sub-county.

Other features include Makongo forest and scenic view, Katende forest, Makuli forest and Nzaui hill. The county has a network of tributaries that flow downstream, successively merging into larger rivers namely Thwake, Kaiti, Kikuu, Muooni, Kambu, Tsavo, Mtito Andei, and Kiboko. The latter eventually channel their waters into Athi River which forms the Eastern border with Kitui county and drains into the Indian Ocean. Most of the rivers are seasonal.

Economic Aspects

Makueni County Share of Gross County Product (GCP)

According to the 2023 Gross County Product (GCP) Report, Makueni County has demonstrated steady economic growth and resilience, positioning itself as a model for sustainable development in Kenya. As of 2023, Makueni Gross County Product (GCP) was at Kshs 151.12 Billion, having expanded by 39 percent from Kshs 108.70 Billion recorded in 2019 and an 11.12 percent increase from Kshs 136 Billion recorded in 2022. However, its contribution to the national economy remains relatively small, with an average annual growth rate of about 1.1 percent, which is below the national GDP growth rate of 4.6 percent. The county's economy is primarily driven by agriculture, with a focus on value addition in key agricultural products.

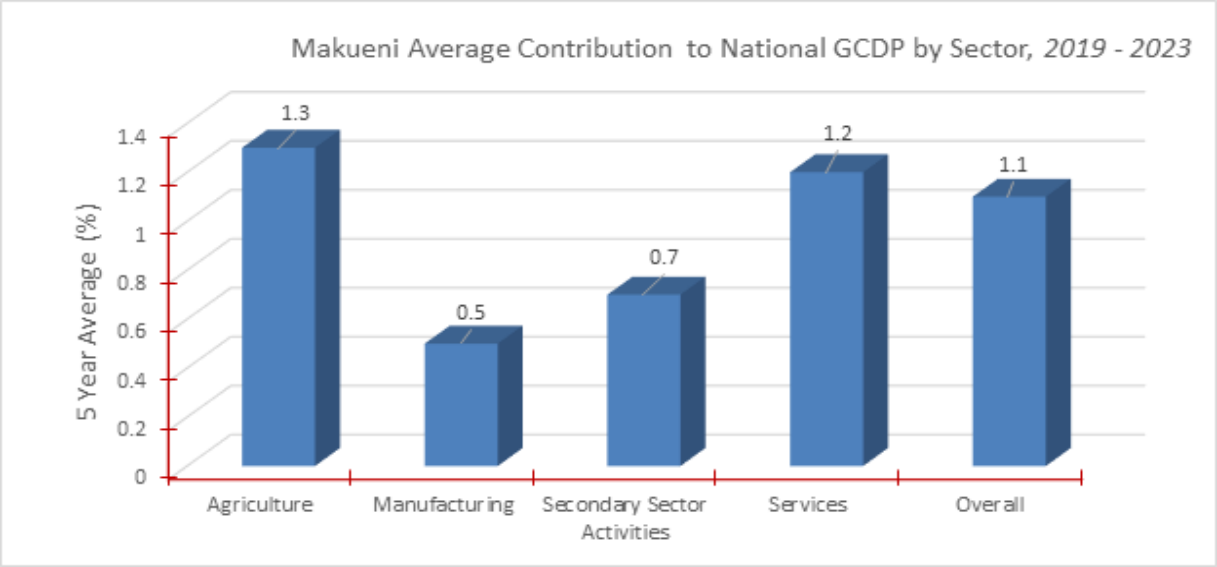


Figure 3: Makueni Average Contribution to National GCP by Sector, 2019 – 2023

The chart above illustrates Makueni average contribution to the Country's GCP by sector over the period from 2019 to 2023. The local agriculture sector plays a significant role, accounting for 1.3 percent of the country's total agricultural output. According to the 2023 GCP report, Makueni agriculture sector was valued at Kshs. 39 billion, representing 26 percent of the county total GCP, making it the dominant sector in the local economy.

Conversely, the manufacturing sector remains underdeveloped, with a valuation of Kshs. 5.5 billion in 2023, contributing only 0.5 percent to the national manufacturing sector. The secondary sector, which includes mining, water supply, electricity supply, sewerage, waste management, and construction, collectively contributed 0.7 percent to the sector at the national level. The services sector includes trade, tourism, transport and storage, education, health, and other service-related activities. Makueni contributes 1.2 percent to the sector's total gross value at the national level. Overall, the county Gross County Product (GCP) accounts for 1.1 percent of the national economy.

Makueni focus on environmental conservation and eco-tourism has further boosted its economic prospects. The presence of Tsavo National Park within its borders attracts local and international tourists, contributing to revenue generation. Infrastructure development is another key driver of growth, with road network expansion and increased household electricity connectivity from 26.2 percent in 2020 to 31.3 percent in 2021. Looking ahead to 2025, Makueni is expected to continue leveraging agriculture, infrastructure, and eco-tourism to drive economic growth. Investments in agro-processing, irrigation schemes, and rural electrification will likely enhance productivity and improve livelihoods across the county. However, challenges such as climate variability, political protests and limited industrialization may hinder rapid economic transformation, necessitating strategic interventions to sustain progress.

Historic County GCP Growth Trends

The Gross County Product (GCP) for Makueni County in 2023 was KShs 151.1 billion showing an 11 percent increase from KShs 136.0 billion recorded in the previous year.

Makueni County contributes 1.1% to the national GDP annually, as reported in the Gross County Product (GCP) 2023 report. From 2019 to 2023, the county's real GCP growth averaged 4% per year, compared to the national real GDP growth, which averaged slightly higher at 4.6% annually

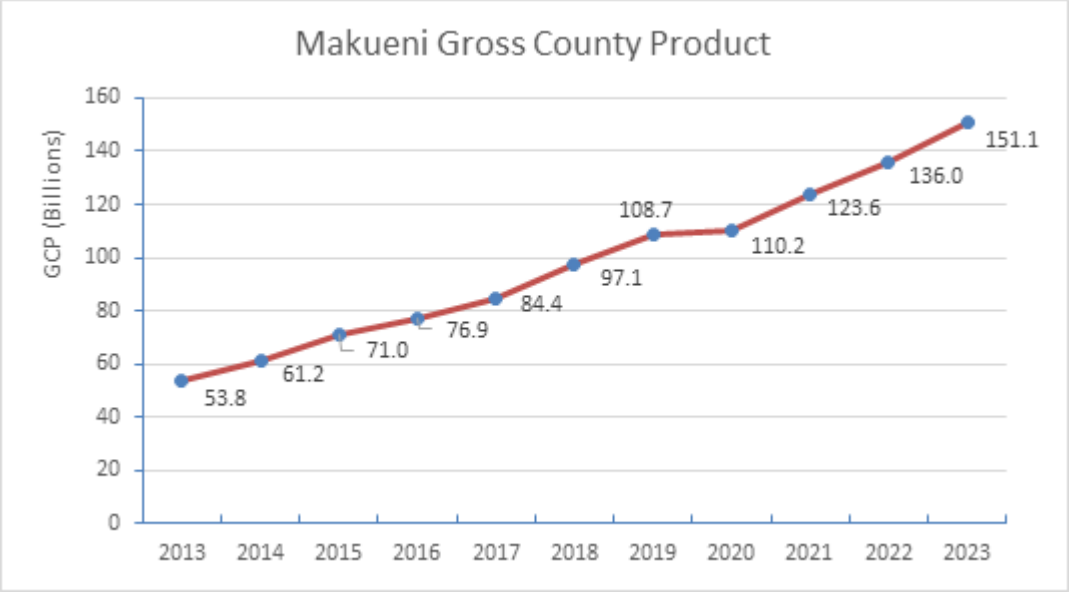


Figure 4:Historic Gross County Product Growth in Makueni County, 2013 -2022

The main sectors contributing to Makueni County's GCP are:

- Agriculture: This sector plays a significant role, driven by crops such as cereals, grains and fruits. Agriculture, forestry and fishing activities were valued at KShs 39.3 billion and recorded the highest contribution to GCP in Makueni at 26% to the total GCP as at 2023. This represented an 8.8% growth from KShs 35.8 billion recorded in 2022.
- Services: This sector includes trade, transport, and communication, contributing 63 percent to the county's economy.
- Industry: This sector encompasses manufacturing and construction, contributing 11 percent to the county gross product.

1.1.2 Description of governance structures in water and sanitation

The responsibilities of county government institutions and leadership in water and sanitation services in Kenya are significant, especially following the devolution of these functions under the Constitution of Kenya 2010. These responsibilities encompass policy formulation, service delivery, regulation, and ensuring climate resilience. In many county governments, the department responsible for water and sanitation services is often integrated with environment, natural resources, and climate change functions. For example, in Makueni County, this is the "Water, Sanitation and Irrigation" department.

The administrative organization structure of the Makueni County Government generally follows the framework outlined in the Kenyan Constitution and the County Governments Act, 2012. The structure emphasizes decentralization of power and decision-making to the county level.

The departments that spearheading water and sanitation service development, implementation and management are the departments in charge of water and sanitation and department of health services under which public health is anchored. Furthermore, the departments overseeing environment and climate change; energy; agriculture, livestock and fisheries works in synergy with these lead departments by supporting policy implementation, adoption and promotion of climate smart technologies and proper hygiene practices. The county climate change fund board has equally supported in mobilizing funds towards implementation of climate resilient water infrastructure, as well as monitoring and evaluation. Across board county departments and relevant national government departments and agencies collaborate in development matters through sector working groups and multi-sectoral approach such as the county steering group.

Table 6: Summary of Makueni County Key Institutions in WASH and their Roles

Institution	Leadership	Mandate	Responsibilities
Executive	Governorship	The chief executive officer of the county, elected by the people.	Overall leadership and policy oversight including WASH frameworks. Resource mobilization
	County Executive Committee Members (CECMs)	Appointed by the Governor to head various county departments. These departments typically cover areas such as: 1. Agriculture, Livestock, Fisheries and Cooperative Development 2. Devolution, Public Participation, County Administration & Special Programmes 3. ICT, Education & Internship 4. Water, Sanitation and Irrigation 5. Finance, Planning, Budget & Revenue 6. Gender, Children, Youth, Sports & Social Service 7. Trade, Marketing, Industry, Culture & Tourism 8. Infrastructure, Transport, Public Works and Energy 9. Lands, Urban Planning & Development, Environment & Climate Change 10. Health Services	Ensure departmental synergies, inter-sectoral and inter-governmental agencies collaborations in WASH development, implementation and management inclusive of resource mobilization.
County WASH Agencies	Managing Directors	County WSPs – Water Service Provision; Makueni Rural Water Board (MARUWAB) – Oversight rural water service provision; Climate Change Fund Board – Resource mobilization and mainstreaming climate resilience in county programmes and activities;	Ensure water service provisions is to expected standards.

Institution	Leadership	Mandate	Responsibilities
		Makueni County Sand Conservation and Utilization Authority – Sand Conservation and management	
Legislative	County Assembly	The legislative arm (law-making body) of the county government, composed of elected Members of the County Assembly (MCAs).	The County Assembly assents to laws that are necessary for the effective WASH functions among other legislations. They also approve budgets and oversight WASH programmes and projects implementation.
Judiciary	County Courts	Handle legal matters within the county	Arbitration on WASH related matters and also its one of the levels of Grievance Redress Mechanism
Other	County Public Service Board	Responsible for recruitment, promotion, and discipline of county government employees.	Employment of relevant experts in WASH implementation.

Coordination between county, national government agencies, private sector and other stakeholders

Kenya's strategy for coordination among county governments, national agencies, the private sector, and other stakeholders such as civil society and community groups is multi-layered and institutionalized through both constitutional mandates and tailored frameworks. The coordination is essential as it supports and informs resource mobilization, collaboration opportunities, progress reports validation and dissemination, information sharing, joint work planning, implementation and monitoring. The Constitution of Kenya emphasizes the need for cooperative intergovernmental relations. It mandates that each level of government must perform its functions in a manner that respects and supports the complementary roles of the other. These platforms ensure that policies and programs are aligned, challenges are collectively addressed, and resources are shared optimally. Several institutional mechanisms and frameworks to operationalize effective coordination in the WASH sector are in place, to which they equally address climate -induced challenges- especially those affecting water and sanitation.

Policy, regulatory and Institutional frameworks; The Ministry of Water, Sanitation, and Irrigation (MoWSI) in Kenya is responsible for developing and implementing policies standards, and strategies for water resource management, sanitation, and irrigation. The ministry collaborates with stakeholders, mobilizes resources and responds to water-related emergencies like droughts and floods. These frameworks mandate that key sectors, are integrated into climate risk management plans. County governments domesticate these policies into local action, for instance in Makueni there is established an all-inclusive County Climate Change Committee whose mandate is to ensure regional vulnerabilities (like those impacting water supply and sanitation) are addressed.

County sector working groups; Sector Working Groups (SWGs) are established within the government to facilitate sector-wide planning, budgeting, and resource allocation. They are responsible for formulating and prioritizing sector budget proposals. They are usually composed of representatives from

county government departments, various national government departments including state corporations and other relevant agencies, as well as representatives from the private sector and civil society. In regard to this, the county has the required sectors and the key ones on matters WASH are; water. environment and natural resources sector and the health services sector. It is through these sector working groups that they ensure a comprehensive, sector-wide approach to planning and budgeting, allowing for the identification, prioritization, and allocation of resources in WASH including streaming climate change resilience measures.

Other established mechanisms within the county include: the county WASH forum which is held quarterly and it brings on board all sector players to pause, reflect and discuss on programmes and projects undertaken with a view of maximizing efforts and resources to attain universal water and sanitation coverage through climate resilient infrastructure and methodologies. Within this platform, gaps and challenges are jointly addressed.

Role of women leadership in water and sanitation service delivery

Water and sanitation are fundamental to health, well-being and socio-economic development. In many rural and semi-arid regions of Kenya, such as Makueni County, access to clean water and adequate sanitation remains a persistent challenge. Women, as primary caregivers and household managers, play a central role in water management and sanitation practices in the community. Their involvement not only influences household health outcomes but also shapes community-level decision-making and development initiatives.

Women in Makueni County play a crucial role in the delivery and management of water and sanitation services. Their involvement spans from community-level participation to leadership positions within water management institutions. Despite their significant contributions, women often encounter challenges that hinder their full participation in decision-making processes related to water resource management.

Further, women are primarily responsible for collecting and managing household water. Due to the region's semi-arid climate and recurrent water scarcity, women and girls often spend several hours daily walking long and riskier distances to fetch water for domestic use and this increases exposure to harassment, assault and sexual violence. This task not only consumes significant time but also affects women's and girls' participation in education, income-generating activities, and community leadership roles. More so, women play a vital role in promoting and maintaining household and community sanitation standards. They are responsible for the cleanliness of living environments, waste disposal and hygiene education within families. In Makueni County, women influence hygiene practices such as handwashing, food hygiene and Menstrual Hygiene Management (MHM) for adolescent girls and other household members. Recognizing and empowering their role is crucial for improving access to safe water, enhancing public health and achieving sustainable development goals.

Over recent years, development programs and county government initiatives have increasingly recognized the importance of involving women in water and sanitation governance structures. Their participation in decision-making ensures that their needs and perspectives are incorporated in the planning, implementation and management of water and sanitation services. However, traditional socio-

cultural norms have historically limited their involvement in formal decision-making roles within water projects. A study that focused on Kaiti Watershed in Makueni County highlighted that women face obstacles such as socio-cultural challenges, economic constraints and policy limitations which impede their active participation in water management initiatives.

To address these disparities, Makueni County has undertaken initiatives aimed at promoting gender equality in leadership roles. The county's Gender Policy, 2021 provides a framework for gender mainstreaming across various sectors including water and sanitation. This policy emphasizes the importance of women's participation in governance and decision-making processes, aiming to create an inclusive environment that leverages the strengths of both women and men.

Efforts to enhance women's leadership in the water sector have also focused on capacity building. For instance, the Kenya Water Institute in collaboration with international partners has initiated training programs to empower women in the water and sanitation sector. Initiatives such as the USAID Kenya Integrated Water, Sanitation, and Hygiene (KIWASH) project have been instrumental in promoting gender equity within local water utilities. For example, the Wote Water and Sewerage Company (WOWASCO) increased female representation in leadership roles and revised policies to facilitate easier access to water connections for women by eliminating the requirement for title deeds. These programs aim to bridge the gender gap by equipping women with the necessary skills and knowledge to assume leadership positions within water service providers. Furthermore, Makueni County's focus on last-mile water connections has transformed rural households by reducing the distance to water sources, a task traditionally undertaken by women. This initiative not only alleviates the physical burden on women but also enables them to engage in other productive activities, contributing to overall community development.

The inclusion of women in leadership roles within water management has been associated with improved service delivery. Studies indicate that water projects with active female participation tend to be more sustainable and effective. Women's involvement brings diverse perspectives and approaches to problem-solving, which can lead to more comprehensive and user-friendly water and sanitation services. In addition, women in Makueni have been at the forefront in promoting the county's water agenda through a Merry-go-round of water tanks initiative locally known as "*Nzangule ya Matangi*" *which* encourages rain water harvesting in every household. Through this initiative, the County realized the strength, power and commitment of women's merry-go-rounds and encouraged groups to buy in the model of merry-go-rounds to buy water tanks as a substitute of the usual purchase of household items and Christmas food items. The model continues to offer an opportunity for group members to save in order to purchase more water tanks thus ensuring all households own water tanks. It also encourages community interaction and their active involvement and participation in development initiatives.

The merry-go-round for water tanks reduced the burden and time lost so that women can engage in productive economic activities. It has also built water secure households. The ripple effects are that the water harvested will then be used for domestic use and kitchen gardens thus food security at household level.

The county government has continued to promote and incorporate women into leadership positions within the water and sanitation sector. For instance, all development committees are mandated through

the public participation manual to be gender sensitive. The existence of a robust participatory development process has ensured the voice of the marginalized and the voiceless are considered in the decision-making and implementation of programs. These efforts are essential to achieve equitable representation and fully harness the potential of women in enhancing service delivery.

The role of the private sector in water and sanitation investments and operations.

The private sector plays an increasingly significant role in water and sanitation investments and operations in Makueni and Kenya at large, driven by the need to bridge the substantial financing gap required to achieve universal access by 2030 and improve the efficiency of service delivery. Majorly in Makueni, the private sector contributes to WASH investments and management in various ways such as through water vending, operating WASH business centres for products such as water and sanitation fittings, small scale social enterprises and community social responsibilities in sanitation and hygiene among others. The following are key areas for private sector collaborations: -

a) **Financing investments:** The private sector provides much-needed capital for infrastructure development, expansion, and upgrading of water and sanitation systems through various models. In Makueni county the Water Service Providers are able to access commercial financing, however with operational efficiency challenges none is yet to benefit. Green financing has gained prominence especially within the sector social enterprises through carbon credits.
b) **Improving operational efficiency:** Private sector involvement often brings in expertise, technology and management practices that can enhance the efficiency of water and sanitation operations. Through, partnerships with social enterprises like Rural Water Management Solutions (RUWASCO), community managed small scale water service providers have been supported in acquisition of digital billing systems to improve their financial management. Additionally, through various partnerships automated water kiosks have been installed across water systems which helps in reduction of non-revenue water.
c) **Service Delivery:** The private sector albeit not extensive has been providing water and sanitation services to county residents through water vending and development of personal farm ponds for small scale irrigation farming.
d) **Innovation and Technology:** Private companies have brought onboard new technologies to improve service efficiency.
e) **Sanitation and Hygiene Promotion:** Private sector players, have been extensively involved in providing sanitation products and services, such as improved toilets, hygiene products, and waste management solutions. They also play a role in marketing and promoting better hygiene practices.

1.1.3 Key Environmental, Socio-Political and Economic Factors Affecting Water and Sanitation Service Delivery

Environmental, political, economic, and social factors influencing service provision.

Makueni County being among the Arid and Semi-Arid Counties faces environmental factors that affect water service provision. These factors are climate change, degraded catchments. unsustainable land

management practices, siltation of existing water sources like sand dams, declining water levels, water pollution, flash floods and mudslides.

Politically, the local governance plays a pivotal role in the WASH sector in Makueni County. The county administration has put in place clear policies and advocacy initiatives aimed at advancing inclusive sanitation programs. For instance, there is a well-defined operational structure with established roles and responsibilities among government agencies, as evidenced by the countywide inclusive sanitation strategy. The county has dedicated votes towards sanitation and hygiene. This political clarity not only streamlines decision-making but also facilitates inter-sector collaboration with national initiatives dedicated to improving sanitation outcomes

Economic factors significantly influence WASH services in the county. Economic factors such as poverty hinder access to WASH services, cost in WASH investments affects affordability hence prohibiting access to low income earners and limited economic opportunities. Such economic realities necessitate targeted interventions, ensuring that cost-effective and sustainable solutions are prioritized.

Social dynamics are intrinsic in shaping WASH outcomes. In Kenya, and by extension in Makueni County, water and sanitation access is not just a service but a constitutional right. Despite this recognition, issues like open defecation continue to pose public health challenges. The county over the period has continuously intensified community engagement, public awareness campaigns and promotion of culturally appropriate sanitation and hygiene practices.

This analysis highlights how integrated political commitment, strategic economic planning, targeted social interventions, innovative technology, environmental stewardship, and a solid legal framework work together to shape the WASH landscape in Makueni County.

Community engagement, stakeholder participation, and public perceptions.

Community engagement, stakeholder participation and public perceptions play a crucial role in shaping discussions around key environmental and socio-political factors affecting water and sanitation service delivery in Makueni County. Our model of engendering public participation focuses on ensuring that both men and women including Special Interests Groups (youth, PWDs, children, the elderly and minorities/marginalized groups and communities) are the champions of their development- "Development by the people, for the people, with the people".

During implementation, our structure of public participation is composed of development committees from the village level to the county level that strictly upholds the one third-gender rule. Effective community engagement ensures that voices of the marginalized are heard, priorities are identified from the village level and services tailored to meet their specific and pressing needs.

Additionally, stakeholder mapping and participation encompassing government agencies, non-governmental organizations, community-based organizations and private sector players is equally vital in coordinating resources, technical expertise and policy support. It is evident that multi-stakeholder platforms provide opportunities for dialogue on pressing environmental concerns such as water scarcity, degradation of catchment areas and the effects of climate change which directly impact the availability and quality of water resources. These platforms also address socio-political issues like governance

structures, resource allocation and policy implementation which influence the effectiveness and equity of service delivery.

Public perceptions significantly shape the acceptance and success of water and sanitation initiatives. For instance, historical experiences with unreliable services, political interference and unfulfilled development promises have led to skepticism in some regions. Therefore, transparent communication and consistent community feedback mechanisms are therefore essential to rebuild trust and ensure that interventions are not only technically sound but also socially acceptable. Integrating local knowledge, cultural practices and community priorities into environmental management and service delivery strategies enhances the responsiveness and inclusivity of water and sanitation programs contributing to improved public health and resilience in the face of environmental and socio-political challenges.

In Makueni County, where access to reliable water and sanitation services remains a significant challenge, involving residents in planning and decision-making processes fosters a sense of ownership, accountability and sustainability for implemented projects.

Gender-specific water and sanitation needs in the WASH sector

Makueni County experiences water scarcity due to erratic rainfall, prolonged dry spells and limited infrastructure. These conditions disproportionately affect women and girls due to their traditional roles in water collection and household management. More so, access to adequate water and sanitation services remains a critical challenge, with pronounced gender-specific needs that often go unaddressed in policy and program implementation. It is evident that women and girls bear the primary responsibility for water collection in many households, frequently walking long distances to fetch water which exposes them to physical strain and safety risks. Tragically, incidents such as crocodile attacks have occurred, leading to measures like restricting women and girls from accessing certain water points during menstruation due to beliefs about increased danger. More so, women and children sometimes face gender-based violence, harassment or assault risks during long walks to water points.

This task reduces the time available for education, income-generating activities and community participation. Besides, the problem of access to water and sanitation is even worse for persons with disabilities and the elderly because they cannot walk long distances to get this important resource. In addition, poor families cannot afford water storage structures because the meager income they have is used to buy food. Inaccessibility of water has led some of these poor households and vulnerable families to contract waterborne diseases because of using unsafe water.

Furthermore, the lack of gender-sensitive sanitation facilities in schools and public spaces disproportionately affects girls particularly during menstruation. Without access to private, safe, and hygienic sanitation, many girls are forced to miss school or drop out entirely. Additionally, women's involvement in the planning and management of water and sanitation projects remains limited, despite their central role in water use and household hygiene.

The County is committed to addressing gender-specific water and sanitation needs by adopting inclusive approaches that prioritize the provision of accessible water sources, construction of gender-segregated and menstrual hygiene-friendly sanitation facilities and the active participation of women, girls and other special interest groups in decision-making processes.

1.1.4 Existing legal and policy frameworks governing water and sanitation at the county Level

1) United Nations 2030 Agenda for Sustainable Development

The United Nations 2030 Agenda for Sustainable Development outlines a transformative vision with a focus on ensuring universal access to safe drinking water, sanitation, and improved hygiene practices as a fundamental human right. The agenda envisions a world where equitable and sustainable access to water and sanitation strengthens public health, promotes economic and social equity, and enhances resilience in communities worldwide, as shown in *Table 7*.

Table 7:Application of Sustainable Development Goals to WASH

Sustainable Development Goal (SDG)	Description	Application to WASH
SDG 1: No Poverty	End poverty in all its forms everywhere	Access to clean water and sanitation reduces poverty by improving health and productivity.
SDG 2: Zero Hunger	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	Clean water is essential for agriculture and food production, and proper sanitation prevents contamination of food supplies.
SDG 3: Good Health and Well-being	Ensure healthy lives and promote well-being for all at all ages	Access to clean water and sanitation reduces the spread of waterborne diseases and improves overall health.
SDG 4: Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Safe water and sanitation in schools improve attendance and performance, especially for girls.
SDG 5: Gender Equality	Achieve gender equality and empower all women and girls	Providing safe sanitation facilities empowers women and girls by increasing their safety and dignity.
SDG 6: Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all	Directly addresses the need for clean water and proper sanitation to improve health and living conditions.
SDG 7: Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all	Sustainable energy solutions can be used to pump clean water and treat wastewater.

Sustainable Development Goal (SDG)	Description	Application to WASH
SDG 8: Decent Work and Economic Growth	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all	Access to water and sanitation improves worker health and productivity, leading to economic growth.
SDG 9: Industry, Innovation, and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	Innovative water and sanitation technologies can improve infrastructure and service delivery.
SDG 10: Reduced Inequalities	Reduce inequality within and among countries	Equitable access to water and sanitation reduces disparities and supports social inclusion.
SDG 11: Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient, and sustainable	Urban planning that includes access to water and sanitation creates healthier and more sustainable communities.
SDG 12: Responsible Consumption and Production	Ensure sustainable consumption and production patterns	Sustainable water uses and waste management practices reduce environmental impact.
SDG 13: Climate Action	Take urgent action to combat climate change and its impacts	Climate-resilient water and sanitation systems can withstand climate impacts and ensure continued access.
SDG 14: Life Below Water	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	Preventing water pollution through proper sanitation protects marine ecosystems.
SDG 15: Life on Land	Protect, restore, and promote sustainable use of terrestrial ecosystems, manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Proper sanitation and wastewater management protect terrestrial ecosystems and biodiversity.
SDG 16: Peace, Justice, and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels	Access to clean water and sanitation supports social stability and reduces conflicts over resources.
SDG 17: Partnerships for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development	Collaboration on water and sanitation projects fosters partnerships and resource sharing

Table 8: Specific Clauses of Sustainable Development Goals applicable to WASH

Clause	Description
Declaration No. 7	Envisions a world with equitable and universal access to safe drinking water, sanitation, and improved hygiene, recognized as fundamental human rights. ***Stresses that access to water and sanitation supports health, well-being, and equity.***
Sustainable Development Goal (SDG) 6	Aims to ensure the availability and sustainable management of water and sanitation for all. Targets include universal access to clean water and sanitation, reducing pollution, protecting water sources, and promoting efficient water use.
Sustainable Development Goal (SDG) 3.3	Seeks to end epidemics of water borne diseases, among others, highlighting the role of safe water in health.

2) Ngor Declaration

The Ngor Declaration on Sanitation and Hygiene, adopted by African Ministers responsible for sanitation and hygiene in 2015, aims to achieve universal access to adequate and sustainable sanitation and hygiene services and eliminate open defecation by 2030.

Proposed Monitoring Indicators:

a) **Access to Sanitation and Hygiene Services:** Percentage of population with access to safely managed sanitation and functional hand-washing facilities.
b) **Equity in Access:** Disaggregated data on access to sanitation and hygiene services by gender, age, and socioeconomic status.
c) **Open Defecation:** Reduction in the percentage of the population practicing open defecation.
d) **Sanitation and Hygiene Budget:** Allocation of budget lines for sanitation and hygiene, aiming for a minimum of 0.5% of GDP.
e) **Leadership and Coordination:** Strength of leadership and coordination mechanisms at national and local levels.

3) Nationally Determined Contributions

Nationally Determined Contributions (NDCs) are climate action plans submitted by Countries that are part of the Paris Agreement (2015). The Paris Agreement, is a global framework to avoid dangerous climate change impacts by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. The monitoring indicators are as tabulated below *Table 9*:

Table 9: Monitoring Indicators in relation to NDCs

Proposed Monitoring Indicator	Description
Water Security	Percentage of population with access to reliable and safe water sources

Proposed Monitoring Indicator	Description
Sanitation Services	Percentage of population with access to improved sanitation facilities
Climate Resilience	Measures of climate resilience in water and sanitation infrastructure and services
Greenhouse Gas Emissions	Reduction in greenhouse gas emissions from water and sanitation sectors
Funding and Investment	Allocation of financial resources for water and sanitation-related climate actions

4) Net Zero Emissions (NZE) 2050

The NZE 2050 scenario aims to achieve net zero CO_2 emissions from the global energy sector by 2050, consistent with limiting global temperature rise to 1.5°C.

The monitoring indicators are as tabulated below:

Table 10: Monitoring Indicators in relation to Net Zero Emissions (NZE)

Proposed Monitoring Indicator	Description
CO_2 Emissions	Reduction in CO_2 emissions from WASH-related activities, such as water treatment and wastewater management
Renewable Energy	Increase in the share of renewable energy sources used in the WASH sector
Energy Efficiency	Improvements in energy efficiency of water and sanitation services and infrastructure
Clean Technology Adoption	Adoption rates of clean energy technologies in water treatment, sanitation, and hygiene facilities
Methane Emissions	Reduction in methane emissions from wastewater treatment and sanitation systems

5) Guidance for monitoring safely managed on-site sanitation (SMOSS)

The highlights here are best practices for monitoring safely managed on-site sanitation (SMOSS). Although more people globally use on-site sanitation than sewer systems, only 1% of the global population using on-site systems has data on excreta emptied and treated off-site, revealing significant monitoring gaps.

These data limitations hinder effective tracking of SDG indicator 6.2.1a (safely managed sanitation) and SDG indicator 6.3.1 (wastewater treatment). Thus, it is important to have SMOSS indicators, data collection methods, and key questions for national monitoring systems.

African

1) The Africa Water Vision for 2025

The Africa Water Vision for 2025 is a strategic framework established by the African Union and the African Ministers' Council on Water (AMCOW) to guide the sustainable management of water resources across the Continent. The framework outlines four key goals:

a) Improving Water Governance by establishing policies, institutions, and legal frameworks that support transparent, accountable, and inclusive water management.
b) Enhancing water wisdom through the promotion of knowledge-sharing, capacity building, and research to foster efficient water management practices.
c) Ensuring access to safe drinking water and sanitation, especially for vulnerable populations.
d) Strengthening Partnerships by encouraging regional cooperation and partnerships among African nations to address shared water challenges across the continent.

2) African Agenda 2063

Agenda 2063 is the African Union's strategic framework for achieving inclusive and sustainable development across Africa. Its primary goal is to create a prosperous, peaceful, and integrated continent by 2063. Agenda 2063 emphasizes ensuring universal access to safe drinking water, sanitation, and hygiene as essential for human development, public health, and economic growth, as shown in *Table 11*:

Table 11: AU Agenda 2063 summary

Priority area	Description
Priority Area 1.7.3: Water Security	This priority area aims to increase the 2013 levels of water demand satisfaction by 100% and to ensure that at least 90% of wastewater is recycled for agricultural and industrial use. Additionally, by 2030, water productivity from rain-fed agriculture and irrigation aims to improve by 60%
Priority Area 1.1.4: Modern and Livable Habitats and quality basic services	This aims at reducing the 2013 level proportion of the population without safe drinking water and without access to improved sanitation facilities by 95 %

3) East African Commission Vision 2050

The East African Community (EAC) Vision 2050 emphasizes universal access to safe water and improved sanitation as essential, therefore ensuring all East Africans can access clean, reliable services. To achieve this, the vision promotes sustainable resource management and infrastructure development to support urbanization and economic growth. It also prioritizes climate resilience, strengthening the region's ability to adapt to climate impacts on water resources.

4) Guidelines for Citywide Inclusive Sanitation (CWIS) Planning (ESAWAS)

ESAWAS (Enabling Safe, Equitable, and Sustainable Sanitation Services) is an association of water and sanitation regulators in Eastern and Southern Africa including Kenya, Rwanda, Tanzania, Zambia, Uganda and Burundi. The ESAWAS initiative provides a framework for developing Citywide Inclusive Sanitation (CWIS) plans.

Several key recommendations have emerged aimed at enhancing CWIS regulatory frameworks, stakeholder engagement, and service delivery across the Eastern and Southern Africa region. They are designed to address the common challenges identified, capitalize on innovative practices, and leverage the achievements to-date for broader regional impact. Implementing these recommendations requires a concerted effort from all stakeholders involved in urban sanitation.

The following are the Strategic Recommendations for Countries Initiating Inclusive Sanitation Regulation:

1. Implement strong regulatory frameworks and systems
2. Establish inter-ministerial sector coordination mechanisms and goals
3. Promote private sector engagement within a public sector approach
4. Tie investment and financing to accountability for results and equity
5. Strengthen system integration and use of WASH data for evidence-based decisions
6. Build capacity of service providers to execute mandates
7. Leverage regional cooperation and knowledge exchange

Key Regulatory Drivers/Lessons in Kenya based on Citywide Inclusive Sanitation (CWIS) Regulatory Journeys in Six Countries _ Eastern and Southern Africa Abridged Report:

- Policy Development: Tailored strategies for urban needs.
- Legislative Reforms: Commitment to updating sanitation laws.
- Regulatory Innovation: Pioneering new regulations.
- Financial Sustainability: Emphasis on utility creditworthiness and innovative financing
- Sector monitoring and reporting: upgrade of information system for sanitation performance tracking

Kenyan Context

1) Constitution of Kenya, 2010

The overall Law governing Kenya is the 2010 Constitution that came into greater effect in 2013. The Constitution confers every Kenyan a right to water and sanitation. According to the constitution, every Kenyan has the right to clean and safe water in adequate quantities and to reasonable standards of sanitation. These rights are in Article 43 (1) (b) & (d) of the constitution. It further assigns the responsibility for water supply and sanitation service provision to the counties. The fourth schedule of the constitution distributes functions with the national government overseeing water resources, including transboundary waters, while the responsibility for water services provision is designated to county governments.

Article 62 provides that all water catchment areas, rivers, lakes, and other water bodies as defined by an Act of parliament shall be held by the national government in trust for the people of Kenya.

2) Water Act 2016

In order to operationalize the Constitution, the Water Act of 2016 amended the Water Act 2002. The purpose of the 2016 Water Act is to align the provision of WASH services by the water sector by incorporating devolution of services as was enshrined in the 2010 constitution. According to the Act, the provision of water and sanitation services has to be done as a shared responsibility between the national government and the county governments. The Constitution guides that the shared services are to be pursued in collaboration and cooperation between the two levels of government. The Act also prioritizes the use of water for domestic purposes over all other uses.

3) Environmental Management and Coordination (Amendment) Act 2015

This Act amends the Environmental Management and Coordination Act of 1999. In addition to providing legal regulations for management and protection of biological diversity, it ensures access to genetic resources, wetlands, forests, marine and freshwater resources.

4) Climate Change Act 2016

This Act of Parliament provides a regulatory framework for enhanced response to climate change and measures to achieve low carbon climate development. The Act provides for incorporating climate change adaptation and mitigation in all sectors, including water. This includes implementation of the National Climate Change Action Plan. The Act establishes the Climate Change Fund, which is a financing mechanism for priority climate change actions and interventions.

5) Forest Conservation and Management Act, 2016

The Act provides for the development and sustainable management, including conservation and rational utilization, of all forest resources for conservation of water, soil, and biodiversity in relation to Article 69 of the Constitution regarding forest resources. It provides for the establishment of the Kenya Forest Service whose role is to manage water catchment areas in relation to soil and water conservation, carbon sequestration and other environmental services in collaboration with relevant stakeholders.

6) Agriculture Act Cap 318

The Agriculture Act is the principal land use statute covering (among other things) soil conservation, agricultural land use, and conservation issues, such as the preservation of soil fertility. The Act prohibits any land-use practices that may intensify soil erosion. It also provides for the protection of water sources and recommends setting aside a riparian zone distance of a minimum of two and a maximum of 30 meters.

7) Kenya Vision 2030

This is the document that spells out "the long-term development blueprint for the country," for 2008–2030. In this document, Water and sanitation are the third out of the seven key social sectors for investing in the people of Kenya. The vision "is to ensure that improved water and sanitation are available

and accessible to all." The vision 2030 is in line with the government commitment to meet the SDGs and specifically, SDG6 that relates to water and sanitation. Specifically, Vision 2030 notes that the "equitable distribution of water, sewerage and sanitation services," is a topic to be addressed under the theme of equity and poverty elimination.

8) National Water Master Plan 2030

The National Water Master Plan, 2030, serves to provide a framework for managing water resources consistent with the country's socio-economic development activities. Its objectives include;

1. To assess and evaluate the availability and vulnerability of country's water resources up to around 2050 taking climate change into consideration;
2. Formulating the National Water Master Plan towards the year 2030 for sustainable water resources development and management in Kenya's six catchment areas;
3. To prepare an action plan for activities of Water Resources Management Authority's regional offices up to the year 2022 to strengthen their water resource management capability, and
4. To transfer technology on water resources development and management through implementation of the Project.

This project covers the whole of Kenya. The project area is delineated by six catchments, as outlined in the National Water Resources Management Strategies. These catchments are the designated units for water resources management by the Water Resources Authority (WRA).

Table 12: The Catchment Area of WRA, Coverage Area and County Boundaries

No.	Catchment Area	Area, km²	Counties
1.	Lake Victoria North Catchment Area (LVNCA)	18,374	Trans-Nzoia, Nandi, Kakamega, Vihiga, Bungoma and Busia
2.	Lake Victoria South Catchment Area (LVSCA)	31,734	Bomet, Homa Bay, Kericho, Kisii, Kisumu, Migori, Nyamira
3.	Rift Valley Catchment Area (RVCA)	130,452	Baringo, Bomet, Elgeyo Marakwet, Kericho, Kajiado, Laikipia, Nakuru, Narok, Samburu, Turkana and Uasin Gishu
4.	Athi Catchment Area (ACA)	58,639	Machakos, Kitui, Makueni, Kajiado and Nairobi
5.	Tana Catchment Area (TCA)	126,026	Tana River, Meru, Embu, Kirinyaga and Kitui
6.	Ewaso Ng'iro North Catchment Area (ENNCA)	210,226	Nyeri, Nyandarua, Laikipia, Meru, Marsabit, Wajir, Garissa, Isiolo, Mandera and Samburu

Makueni County is located in Athi Catchment Area (ACA). The projects planned for development in Makueni County by the year 2030 under the National Water Master Plan 2030 are presented in Table 13 below.

Table 13: Proposed Projects by Government Authorities under the National Water Master Plan 2030

No.	Name of Project	Irrigation Area, ha	Project Type	Water Source Facilities		Executing Agency
				Type	Name of Dam	
1.	Kanzalu Irrigation Extension	3,500	Extension	Irrigation	Weir	NIB
2.	Kibwezi Irrigation Extension (Munyu Multi-dam)	15,000	Extension	Multipurpose dam	Munyu	TARDA
3.	Kibwezi Greater Irrigation Extension (Thwake Multi-dam)	42,000	Extension	Multipurpose dam	Thwake	NIB

The proposed dams in the county under Athi Catchment Area are presented in Table 14 below.

Table 14: Proposed Dams under the National Water Master Plan 2030

No.	Name of Dam	Purpose	Effective Storage, MCM	Yield, m^3/s	Estimated Cost, KSh million
1.	Kiteta	Domestic and industrial water supply	16	0.2	2,983
2.	Thwake	Domestic and industrial water supply (17,000 ha) and hydropower (20 MW)	594	29.5	8,439

9) National Water and Sanitation Investment Plan (NAWASIP)

The National Water and Sanitation Investment and Financing Plan (NAWASIP) is a proposed course of action towards achieving universal access to water and sanitation by 2030. The plan is in line with the Water Act 2016, and is anchored in four pillars of increasing access to safe water and dignified sanitation, fund development, water resource management and climate change, and research and innovation. The plan will be implemented by building water service lines, boreholes, small dams, and sanitation facilities in rural areas.

10) Fourth Medium-Term Plan also known as Bottom-Up Economic Transformation Agenda (BETA) 2023 – 2027

The Fourth Medium Term Plan will implement the last five-year phase of the Kenya Vision 2030, leaving only two (2) years to the end of the 22-year long-term blueprint. The implementation of the Kenya

Vision 2030 is through successive five-year Medium-Term Plans (MTPs), namely: MTP I (2008-2012), MTP II (2013-2017), MTP III (2018-2022) and MTP IV (2023-2027). The MTP IV has five sectors. Water and Sanitation improvement lies in the infrastructure sector. Infrastructure sector growth is projected to moderate to 4.9 per cent in 2023 from 5.5 per cent in 2022 and, thereafter, gradually attain 5.9 per cent by 2027. Growth in the sector will be supported by: expansion of water, irrigation, and sanitation infrastructure. To ensure a people centred and inclusive growth, the programme entails the following projects;

a) Construction of small dams and water pans
b) Water harvesting for irrigation and domestic use
c) Exploitation of ground water for irrigation in arid counties
d) Integrated regional development dams.

11) Kenya Environmental Sanitation and Hygiene Policy 2016 – 2030

The policy envisions a clean, healthy and economically prosperous Kenya free from sanitation and hygiene related diseases and seeks to ensure universal access to improved sanitation, clean and healthy environment by 2030. The Policy takes a rights-based approach and redirects efforts of the government at national and county level towards achieving the Kenya Vision 2030 and the global Sustainable Development Goals (SDGs).

To achieve the goal of universal access to improved sanitation and a clean and healthy environment, the Policy will focus on eight key strategies as follows:

1. Scaling up access to improved rural and urban sanitation.
2. Assuring a clean and healthy environment free from public nuisances.
3. Fostering private sector participation and investment in sanitation.
4. Building governance and leadership capacity for sanitation.
5. Sustainable financing and investment for sanitation.
6. Building enabling legal and regulatory environments.
7. Establishing an effective research and development framework for sanitation.
8. Strengthening monitoring and evaluation systems for the sanitation sector.

12) Kenya Rural Sanitation & Hygiene Protocol 2023

This is a strategic guideline aimed at improving rural sanitation and hygiene as part of Kenya's broader public health objectives. This protocol emphasizes sustainable practices in sanitation and hygiene, aligning with the country's commitment to achieving universal health coverage and Sustainable Development Goal 6 on clean water and sanitation. Key Aspects of the Protocol: Eradicating Open Defecation; Enhanced Infrastructure and Waste Management and Promoting Hygiene Practices

13) Public Health Act Cap 242

This Act outlines regulations for public health, including provisions related to sanitation facilities and safe water supplies. It establishes health authorities, defining their functions in protecting public health.

A key aspect of the Act is the requirement to provide safe water and ensure the proper disposal of sewage to prevent disease transmission.

Key provisions regarding sanitation and safe water include:

a) **Safe Water**
   The Act mandates the provision of adequate and accessible potable water storage, ensuring that it is clean and properly covered.
b) **Sanitation**
   It includes provisions for the proper drainage of buildings, including the use of sewers and the maintenance of drains, latrines, cesspools, and septic tanks.
c) **Nuisance abatement**
   The Act prohibits the creation of nuisances that are harmful to public health, including those arising from sewage and improper waste disposal.
d) **Local authority enforcement**
   Local authorities are responsible for enforcing these provisions, ensuring compliance with the regulations and taking necessary action to address violations.

In essence, Cap 242 provides the legal framework for ensuring access to safe water and sanitation, which are crucial for protecting public health in Kenya. It empowers the government and local authorities to regulate and enforce measures that promote sanitation and prevent the spread of waterborne diseases.

14) WASREB Guidelines & Impact Reports

The Water Services Regulatory Board (WASREB) is responsible for licensing Water Service Providers (WSPs), setting standards for water and sanitation services provision, and enforcing compliance to standards. The regulatory agency is an autonomous institution from the Government of Kenya (GoK) and the Ministry of Water, Sanitation and Irrigation (MoWSI).

Water quality parameters are described in the WASREB guidelines. Limits for all parameters have been defined by the Kenya Bureau of Standards (KEBS) and are legally binding

15) Sanitation Economy Estimate 2023

The sanitation economy is a sustainable approach to sanitation that uses innovation and smart technologies to create economic value. In Kenya, the sanitation economy in 2022[3] was valued at $1.7 billion, but could reach $2.8 billion if universal access is achieved. This value represents the aggregate of economic activities across the sanitation sector, including the toilet economy (products and services for safe sanitation), circular sanitation economy (reuse of waste for resources like biogas and fertilizers), and smart sanitation economy (data-driven and tech-based solutions).

The sanitation economy aligns with Kenya's ambitious Vision 2030 and Sustainable Development Goal 6 (clean water and sanitation for all). It highlights the transformative role of sanitation in improving public health, reducing poverty, and addressing environmental concerns.

Incorporating resilient and circular sanitation solutions can help address challenges related to climate change, such as floods that undermine sanitation infrastructure. Building a thriving sanitation economy not only supports public health but also catalyzes sustainable development and economic empowerment.

Makueni County

1) Makueni County Water Act 2020

The Makueni County Water Act 2020 establishes the legal and institutional framework for provision of water, sanitation and sewerage services in the county with key objectives on development and sustainable management of water and sanitation services and related infrastructures and utilities. The Act has provisions for;

1. Legal registration of the Water Service Providers by the County Government through licensure. The WSPs will also have a performance agreement with the county government for the purposes of exercise and performance of all its powers and functions under the license specifying the targets to be achieved.
2. Sanitation services and pollution control through supervision and monitoring of the nature and composition of the effluent and maximum quantity of effluent proposed to be discharged in one day.
3. Development and management of waterworks through provision of licenses and permits to any party planning to undertake construction, development and maintenance of waterworks and having a priority water works development schedule.
4. Management of water resources through promotion of alternative sources including rain water harvesting, formulation of water resources management strategies, storm water management and provision of authorization on borehole drilling
5. Development of public private partnerships subject to the approval of the Regulatory Board to enable the WSPs exercise and perform its functions.
6. Pricing of water supply and sanitation services by the WSPs to facilitate sustainable provision of WASH services.

2) Makueni County Vision 2025

Makueni County Vision 2025 is a blueprint published in 2016 with an overall objective of inclusive and economic transformation by 2025 through improved access to quality water and health services, access to quality education, increased job creation, increased household incomes and sustainable food security. It outlines that water is scarce due to periodic droughts, pressure from population growth, shrinking water sources resulting from environmental degradation, limited resource allocation for water development and limited awareness on water harvesting and management. The Vision 2025 recognizes the role of water in socio-economic transformation and commits to deliberate efforts to invest in modern and appropriate technology in water harvesting and distribution through a Transformation program christened 'Kutwiikany'a kiwu'. -"to contain water"

3) Makueni County CIDP 2023-2027

The Makueni County Integrated Development Plan 2023-27 is the third generation of the five-year county plans since devolution. It is the strategic framework guiding the county's development initiatives over a five-year period.

The Makueni County's Integrated Plan (CIDP) key objective is to reflect strategic priorities, specific goals, objectives, a cost based implementation plan, provision for monitoring and evaluation and clear reporting mechanisms in the County. The plan is actualized through five Annual Development Plans (ADPs) with cross-cutting themes of climate change, disaster risk reduction, and social inclusion. The plan outlines the specific goals to provide affordable and quality water for household consumption and other uses, promote sustainability of water resources, promote natural resources and environmental catchment areas restoration, conservation, protection and management for sustainable development and climate change resilience. This will be done through developing water infrastructure to harvest and distribute water, enhancing the water governance, conservation of water catchment areas and mobilization of more resources to invest in water development.

The specific goals for Water, Environment and Natural Resources Sector in Makueni County are to:

1. Provide affordable quality water for household consumption and use in agricultural and industrial activities;
2. Promote sustainability of water resources for enhanced development in water and sanitation infrastructure;
3. Promote natural resources and environment catchment areas restoration, conservation, protection and management for sustainable development, posterity and community resilience;
4. Enhance natural resource management and sustainability for climate change resilience.

To attain the aspirations, the County government has developed programs to be implemented, expected outputs, targets and performance indicators with flagship projects. The programmes are presented in the *Table 15* below;

Table 15: Water, Environment and Natural Resources Sector Programmes based on CIDP 2023 - 2027

Programme Name	Objective	Key Outcome
Integrated Water Harvesting, Storage, Treatment & Distribution	To increase access to improved water sources from 44.2 percent to 70 percent To reduce the average distance to improved water sources from 5 km to 2 km	Increased access to improved water sources
Urban and Rural Water Governance	To improve urban and rural water governance	Increased access to improved and reliable water
Forest & Landscape Restoration and Management	To conserve forest resources and protect water catchment areas To promote sustainable utilization of forest and non-forest products.	Sustainably managed and restored ecosystems
Community Based Wildlife Conservation	To enhance community-based wildlife conservation and management	Enhanced community-based wildlife conservation

Programme Name	Objective	Key Outcome
Pollution Control and Management	To reduce air, soil, noise and water pollution	Clean and safe environment
Environmental Education, Advocacy and Research	To promote environmental education, advocacy and research	Behavioral Change towards environment conservation and use of environmental good and services
Sustainable Natural Resource Development	To enhance sustainable natural resource harvesting/extraction and utilization	Enhanced sustainable natural resource harvesting/extraction and utilization
Natural Resources Value Addition and Value Chain Management	To increase efficiency in utilization of natural resources	Increased efficiency in utilization of natural resources
Integrated Solid Waste Management	To improve solid waste management in both rural and urban areas	Improved solid waste management in both rural and urban areas
Integrated Liquid Waste Management	To enhance access to improved sanitation in urban areas	Enhanced access to improved sanitation in urban areas
Climate Change Mainstreaming	To mainstream climate change initiatives	Enhanced climate change resilience
Policy, Legal and Institutional Frameworks Development	To strengthen the sectoral policy, legal and institutional frameworks	Strengthened governance

Figure 5 presents the linkage between the CIDP and other International, National and county development plans and budgets.

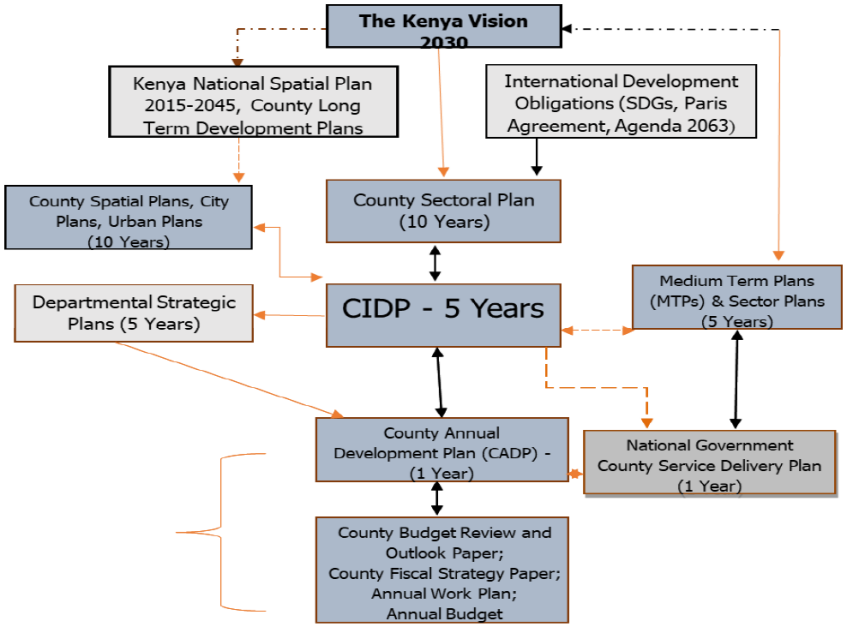


Figure 5: CIDP Linkages with other Planning Framework

4) Makueni County Environment Action Plan 2025-2029

Makueni County Environmental Action Plan 2025-2029, highlights challenges on water access and availability, emphasizes on catchment protection and enhancing enforcement to deter water pollution, it also speaks on accelerating awareness on Community Led Total Sanitation to eradicate ODF scenarios. It has outlined the climate hazards experienced in the County and interventions thereof, including development of waste management infrastructure and calls for strengthening of governance institutions and more collaboration with Government Agencies like WRA, NEMA, KEFS etc.

5) Makueni County ADP 2024/2025

The County Annual Development Plan 2024/2025 is the second annual development plan implementing the Makueni CIDP 2023/2027 which will guide the County developments in the Financial Year 2024/2025. The plan presents development programs, projects, and priorities to be implemented in the FY 2024-2025 plan period, the overall resource requirement for the FY 2024/25 plan, the resource gap and measures to mobilize for the resource gap. The ADP highlights that the government intends to invest in the construction and rehabilitation of water supply systems to support economic activities and improve the quality of lives of the residents. The ADP also emphasizes on adoption of climate smart practices and investing on irrigation infrastructure to reduce reliance on rain.

The ADP reveals that the County's water demand is 60,000m^3/day against the current production of 30,000m^3/day creating a deficit of 30,000m^3/day and the average walking distance to the nearest improved water source is 4kms. It further indicates that there are rising fuel prices and costs of living pushing costs of accessing water resources high and gasoline-dependent pumping systems less sustainable. To mitigate the challenge, the government is tasked to promote renewable sources of energy.

The Annual Development Plan proposes a" **One Government Approach**" to address the challenges in the water and sanitation sector. Interventions in this approach will include; soil and land management, watershed management, efficiency in irrigation (one drop more crops approach), green roads for water along the roads and urban areas, rain water harvesting in government buildings, environmental protection, and governance of water resources.

6) Makueni County Spatial Plan 2019-2029

The County Spatial Plan (CSP) is a GIS plan and a blueprint representing the jurisdictional territorial space in the County. A Spatial Development Framework aims to promote sustainable functional and integrated human settlements, maximize resource efficiency, and enhance regional identity and unique character of a place. The key strategies include expanding the water infrastructure such as dams, pipelines and boreholes to increase water accessibility in rural areas. The plan also prioritizes on protection of water sources emphasizing on watershed conservation.

7) Makueni County Revenue Administration Policy

The policy focuses on maximizing the county's own source revenue potential while also ensuring that the county's financial sustainability is protected and improved over time to ensure sustainable development. The county government has the power to impose taxes, fees and charges necessary to finance its functions following the principles of neutrality, efficiency, certainty and simplicity, effectiveness and fairness. The County Revenue Administration Policy seeks to embrace cost effective systems of revenue administration, formulate tariff and pricing laws, manage revenue waivers and variations.

8) Makueni County Community Health Services Policy 2020-2030

The policy focuses on ensuring the delivery of quality community health services while embracing the principles of protection of the rights and fundamental freedoms of the vulnerable and special groups. The policy is geared wholly on community engagements to ensure that gains are sustained. It is focused on community health leadership and governance, mobilization of community resources, improved accessibility to community health service delivery, available and sufficient community health products, community-based health information system and sustainable financing of community health services.

9) Makueni County Environment and Climate Change Policy 2021

The main aim of the Policy is to provide a framework to guide in the management of the environment, natural resources and to address issues faced by the County due to the changing climate. The priority areas are forest, freshwater and wetlands ecosystems, hills, arid and semiarid ecosystems, grassland ecosystems, land, soils and biodiversity. Stakeholder engagement and strategic partnerships is essential to encourage environmental management stewardship. The policy is also geared towards reduction in environmental pollution through adoption of renewable sources of energy, capacity building in waste management value chains and adoption of appropriate technologies on waste management.

10) Makueni County Disaster Management and Special Programmes Policy 2021

The Policy is a comprehensive approach for increased political commitment to disaster management encouraging the county to take lead with the support of other stakeholders as mandated by the Constitution. It is anchored on prioritization of lives in emergency situations, reliable alternative communications systems, effective documentation and sharing of lessons, early warning signs, building on community traditional coping strategies in mitigation, response and recovery.

The key objectives of the policy include establishment and operationalization of structures up to village level, promotion of institutional capacity and resource mobilization, identification, assessment of disaster risks and dissemination of disaster management information and public awareness on disaster management.

11) Makueni Countywide Inclusive Sanitation Strategy Nov 2019

Countywide Inclusive Sanitation (COWIS) is built on the concept of City-Wide Inclusive Sanitation (CWIS) which is a comprehensive approach to sanitation planning and financing based on an inclusive

and a shared vision in sanitation. The overall objective is to provide technical assistance for the implementation of Kenya's national sanitation program through the application of best practices and innovative approaches, as well as knowledge sharing activities to raise awareness and create demand for sanitation solutions. The strategy is particular on the elimination of open defecation practices and improvement of sanitation conditions in rural communities and urban settlements.

12) Makueni County COVID-19 Social Economic Re-Engineering Recovery Strategy 2020/21-2022/23

The guiding principle of Makueni County COVID-19 Re-Engineering Recovery Strategy 2020/21- 2022/23 is response, recovery and thriving. The strategy is a long-term intervention for sustained development. The strategy aims to treat the affected people and flatten the curve, preventing new infections and emergence of a second wave. COVID-19 placed a high demand on water for hand hygiene which compelled the County to ensure continuous provision of water. To enhance improved connectivity of households the interventions proposed in the strategy include expansion and rehabilitation of existing piped connection, expansion of sewer infrastructure, construction of hand washing facilities, provision of waste collection facilities, promotion of environmental cleanup exercises, integration of public-private partnership arrangements to enhance water provision, community inclusive involvements in water management and governance.

13) Makueni County Climate Risk Assessment Report 2024

The report reflects the outcomes of a Participatory Climate Risk Assessment (PCRA) to guide decision makers, development agencies and stakeholders in addressing climate change challenges building resilience at the local level. The key hazards identified during the survey were erratic rainfall patterns and prolonged droughts resulting in challenges in water availability. Strategies identified for adaptation and building resilience of the impacts include community and household water harvesting, rehabilitation, expansion, distribution and protection of water sources.

Water pollution was also identified as a potential challenge emanating from poor solid and liquid waste management and soil erosion. Establishment of a sanitary landfill, recruitment of more personnel, construction of water treatment facilities and purchase of more skip bins, skip loader and equipment are proposed interventions to control the risk.

14) Makueni County Integrated Smart Survey Report June 2023

As a result of frequent droughts caused by failed consecutive rainfall seasons there is a threat in household food security. The reports indicate increased cases of malnutrition among children under 5 years, pregnant mothers and lactating women. The main sources of water reported were rivers (30%) and boreholes (20%) and half of the households lacked stable water sources. It further highlights that only 27% of the households treated their drinking water. The majority of the households practiced handwashing mostly after visiting the toilet and before eating and only 59.3% of households practiced hand washing before cooking. 78.06% of the HHs in the county are washing hands with soap and water, 13.09% of the HHs are washing hands with water only and 8.73% only use soap on instances when they

can afford it. People with access to handwashing facilities were more likely to wash their hands reducing the exposure to diarrheal causing germs. The report emphasizes on the importance of practicing proper hand sanitation and hygiene in prevention of fecal oral diseases.

M&E reporting, data and information management frameworks at county level

Chapter 12 of the Constitution of Kenya provides for openness and accountability in management of public resources. This includes among others a robust system of monitoring and evaluation as a way of ensuring efficient and effective implementation of policies, programmes and projects geared towards socio-economic transformation, by public bodies.

Monitoring, Evaluation, Accountability, Reporting and Learning (MEARL) is critical for the realization of Makueni County's development agenda. The government of Makueni County recognized the importance of a well-established MEARL process and thus developed a Monitoring and Evaluation policy, 2021 to provide an overall framework for the establishment and implementation of the MEARL function for quality service delivery.

The County Integrated Monitoring and Evaluation System (CIMES) guidelines 2019 provide a framework for the establishment of County M&E systems to track county development results and performance. The system verifies whether the activities of each county's development projects or programs adhere to planning timelines and targets as presented in the County Integrated Development Plan (CIDP) and whether resources are being used in an effective and efficient manner. For sustainable MEARL, the CIMES guidelines provide for structures, among them committees at different levels which play a key role in generating and dissemination of M&E feedback in line with the National Integrity Monitoring & Evaluation System (NIMES). The structures as provided in the guidelines have been adopted and operationalized in the county and there exists a directorate exclusive for coordinating implementation of MEARL activities which is anchored under the department of Finance affairs.

Currently MEARL activities, specifically M&E reporting is undertaken through monthly and quarterly cycle of data collection, periodical evaluation and action taking as defined in CIMES guidelines. In addition, there is a county centralized online dash board reporting system. The foregoing notwithstanding, there is still need to ensure that M&E becomes a culture, a standard process and a habit of the county by strengthening the M&E unit through capacity building and training together with departmental M&E focal persons.

1.2 Water in the County Economy

1.2.1 Integration of water sector development with the county's economic growth strategies

Role of water in economic planning and county development objectives.

Water plays a pivotal role in economic planning as it is a fundamental resource for various sectors, including agriculture, industry, energy, and domestic use. Effective water management ensures food security through irrigation, supports industrial processes, and provides clean drinking water, which is essential for public health. Additionally, water infrastructure projects, such as dams and reservoirs, contribute to economic resilience by mitigating the impacts of climate change and natural disasters.

In Makueni County, the development objectives are centered around creating a resilient economy and improving the quality of life for its residents. Key priorities include enhancing water and sanitation services, promoting sustainable agriculture, improving infrastructure, and fostering community resilience. The county's integrated development plans emphasize accountable leadership and efficient service delivery to achieve these goals

Water's contribution to economic sectors such as agriculture, industry, and services.

According to the 2023 GCP Report, water supply contributes KShs 732 million to Makueni County's Gross County Product, representing 0.6% of the county's total GCP of KShs 150 billion. While the direct financial contribution of water supply (0.6%) to GCP is low, its indirect economic impact is immense. Investing in water infrastructure translates into higher economic output across agriculture, industry, and services.

Water plays a vital role in shaping the economic sectors of Makueni County, particularly agriculture, industry, and services:

1. **Agriculture**: Makueni County heavily relies on water for irrigation to support its agricultural activities. The county has implemented water harvesting techniques and infrastructure to mitigate the effects of frequent droughts and ensure sustainable farming practices. This is crucial for food security and the livelihoods of many residents.
2. **Industry**: Water is essential for industrial processes, including manufacturing and agro-processing. Investments in water infrastructure have been made to support industries that depend on water for production and operations.
3. **Services**: The services sector benefits from improved water access, particularly in areas like health, education, and tourism. Enhanced water supply contributes to better sanitation and hygiene, which are critical for public health and service delivery.

Efforts to improve water management and infrastructure in Makueni County aim to boost these sectors and drive sustainable economic growth

Water conservation and sustainability measures that are being implemented in the county.

Makueni County has been actively implementing various water conservation and sustainability measures to address challenges like frequent droughts and water shortages. Here are some key initiatives:

1. **Water harvesting Programme:** The County Government has been promoting and implementing a water harvesting for socio-economic transformation program, known as Kutwiikany'a Kiw'u. This a holistic initiative involving water harvesting and management through substantial investment in constructing dams and drilling boreholes to improve water accessibility for the people of Makueni. The program not only aids in poverty reduction but also fosters social stability and stimulates economic growth by providing safe drinking water for households and irrigation.
2. **Green roads for water programme**: the programme integrates water harvesting techniques into road construction to address water scarcity and enhance agricultural productivity. This

initiative involves constructing structures like mitre drains, cross-drains, and drifts to capture road runoff, which is then channeled to irrigate crops and recharge groundwater and ultimately builds climate resilience.

3. **Environmental Conservation**: Efforts are being made to protect water catchment areas and reduce environmental degradation. This includes afforestation, reforestation and community sensitization programs in an effort to increase tree cover while protecting the catchments.
4. **Policy Framework**: The Makueni County Water Policy, developed in 2019, provides a structured approach to managing water resources sustainably. It aligns with Kenya's Vision 2030 and the Sustainable Development Goals.

These measures are part of the county's broader strategy to ensure water security and promote sustainable development.

1.2.2 Key economic activities dependent on water

Water is a cornerstone of economic activity, and its usage varies significantly across sectors. Here's an assessment tailored to Makueni County's context:

Water Usage by Major Economic Sectors

1. **Agriculture**: Globally, agriculture is the largest consumer of water, accounting for approximately 70% of total freshwater withdrawals. In Makueni County, agriculture is a key economic driver, with irrigation playing a vital role in enhancing food security and productivity.
2. **Industry**: Industrial activities, including manufacturing and processing, are significant water users, consuming about 20% of global water resources. In Makueni, industries like agro-processing and small-scale manufacturing depend on water for operations.
3. **Domestic Use**: Domestic water consumption, though smaller in scale (around 10% globally), is critical for urban and rural households in Makueni, supporting sanitation, cooking, and drinking needs.
4. **Energy Production**: While not a major sector in Makueni, energy production globally consumes water for cooling and hydropower.

Critical Water-Dependent Nodes

- **Agricultural Irrigation Systems**: These are essential for crop production, especially in arid and semi-arid regions like Makueni.
- **Agro-Processing Facilities**: These rely on water for cleaning, processing, and packaging agricultural products.
- **Urban Water Supply Systems**: Ensuring consistent water supply to households and businesses is crucial for economic stability.

Alignment with Makueni's Economic Development Strategy

Makueni County's development plans emphasize sustainable water management to support agriculture, enhance food security, and improve livelihoods2. Investments in irrigation infrastructure and water conservation techniques are central to these strategies.

Impact of Water Supply on Productivity and Economic Sustainability

Water has had a major impact on the socio-economic growth of Makueni County. These impacts are as shown in the **Error! Reference source not found.** below:

Table 16:Impacts of Water on Various Sectors in Makueni County

Sector	Impact
Agriculture	• **Increased food production** - Adequate water supply through irrigation enhances agricultural productivity and livestock health. Farmers can cultivate a wider variety of crops, leading to increased food production and food security. • **Improved livelihoods** - Increased agricultural output translates to higher incomes for farmers, reducing poverty and improving their livelihoods. • **Market access** - Reliable water supply facilitates the cultivation of cash crops for market sale, generating income and stimulating local economies.
Health	• **Reduced waterborne diseases** - Access to clean and safe drinking water significantly reduces the prevalence of waterborne diseases such as diarrhea, cholera, and typhoid. This improves public health and reduces healthcare costs. • **Improved hygiene and sanitation** - Adequate water supply promotes better hygiene practices, leading to improved overall health and well-being.
Education	• **Improved school attendance -** Access to clean water and sanitation facilities in schools improves school attendance, particularly for girls, and creates a more conducive learning environment.
Industry	• **Industrial development and job creation** - Reliable water supply is essential for various industries, including manufacturing, processing, and tourism. This attracts investment, creates jobs, and stimulates economic growth.
Environment	• **Reduced deforestation -** Access to alternative water sources reduces reliance on firewood for domestic use, thereby mitigating deforestation and environmental degradation. • **Improved water resource management -** Sustainable water management practices, such as rainwater harvesting and efficient irrigation, help conserve water resources and protect the environment.

In summary, water is a critical enabler of economic activities in Makueni County. Prioritizing sustainable water management and aligning it with the county's development goals can significantly enhance productivity and economic resilience.

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

Key barriers limiting economic growth due to inadequate water services.

Makueni County faces significant constraints to economic growth due to challenges in water access, quality, and management. Water sources in both urban and rural areas in Makueni County are distressed due to erratic changes in rainfall and frequent droughts. Taking into account the domestic, institutional, commercial and livestock water demands, the total water demand for Makueni County is 65,664 m^3/day, 66,350m^3/day and 75,265 m^3/day for the current (2024), initial (2025) and future (2030) years. The inadequate water services which is a key barrier limiting economic growth can be attributed to:

a) **Limitations in infrastructure;** Lack of infrastructure for water storage and distribution leads to low water harvesting, distribution and unequal access, hindering agricultural and economic activities. The rural population often lacks access to improved water facilities in that, 51% of household's access water from an unimproved source as per the County Annual Development Plan 2024/2025. The other factor is the level of non-functional water systems from the various county sources. Non functionality is as a result of a myriad of causes such as climatic conditions which leaves some sources dry and reduced recharge rate, aging infrastructure and water related technologies utilized among others.
b) **Inefficient water management;** Water governance is an important component in water management. It covers both the protection of the water source and ensuring proper access of water to the community. The current management structure for service provision is under two major models, that is, the water service providers and community management committees which are under Makueni Rural Water Board. There is a challenge in capacities which needs to be prioritized. There is need to enhance water governance through trainings in the existing water projects and Water service providers.
c) **Regulatory and institutional challenges:** the county has a Water Policy 2019, Water Act 2020 and Waters services provision regulations 2021, Makueni county environment and climate change policy 2021 and the Makueni county climate change Act 2022, which are the major frameworks in water conservation, exploitation, management and service provision. This is in addition to relevant national regulatory and institutional frameworks. Despite the existence of several legislations at both levels of government, there exists a challenge in implementation of these frameworks due to budgetary constraints, compliance and enforcement due to low coordination between national agencies and the county and most of the county legislations are due for review to align with the changing sector needs.
d) **Climate change risks:** The natural water systems in urban and rural areas in Makueni County have been affected by decreased amounts of rainfall for several seasons. Frequent droughts associated with climate change have impacts like forest fires which suppress the area under forest cover which serves as a major part of the catchment. Another outcome is human-wildlife conflicts for the available limited water sources, environmental degradation exposing the loose soils to erosion. The impacts of climate change are immense and affect both urban and rural populations increasing the vulnerability of communities to unsafe drinking water. Strategies to enhance climate resilience in the county and mitigate issues like destruction of water sources necessitate action.

e) **Financial constraints:** water development is capital intensive and the county budget alone cannot actualize universal water coverage due to the various competing county needs. In addition, the county WSPs have lower operational efficiencies making them rely on county and donor subsidies for their infrastructure development and improvement, for instance, there are accumulated debts by some of the WSP, such as, MBONWASCO which is reported to have accumulated debts amounting to Kshs. 8,499,301.90. Despite deliberate efforts in mobilizing donor resources the gap to meet the growing demand is huge.

f) **Water quality:** water quality in the county varies across different locations, with some areas facing challenges due to environmental and human activities. The major source of water for domestic, agricultural and industrial use is surface water from rivers, springs, earth dams, sand dams and shallow wells along the river line. The water quality from the rivers such as Athi River is reduced due to increased farming activities and pollution upstream. For ground water the county faces challenges of high fluoride, iron and salinity levels in some areas. Efforts to improve water quality done by the county include fencing dams, restricting farming near water sources, installation of water treatment facilities, construction of Decentralized Treatment Facilities (DTF) to improve sanitation and adopting better land management practices.

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

Climate change has significantly impacted water availability and service provision in Makueni County. The region, classified as Arid and Semi-Arid (ASAL), faces challenges such as prolonged droughts, erratic rainfall, and increased temperatures, which exacerbate water scarcity. These climatic changes affect rivers, springs, and groundwater sources which are the main sources of water, leading to reduced water quality and availability.

In addition, climate change vulnerability poses a significant threat to water supply reliability, disproportionately affecting women and marginalized groups who are often the most vulnerable in society. The increasing frequency and intensity of hazards such as droughts, floods and rising temperatures directly disrupt water availability, quality and accessibility. Droughts lead to the depletion of surface and groundwater resources thereby forcing affected communities to travel longer distances in search of water. This burden falls largely on women and girls who are traditionally responsible for water collection thus reducing their time for education, income-generating activities and community participation.

This matrix evaluates vulnerability, severity, and frequency of climate risks for different water sources:

Table 17:Vulnerability, Severity and Frequency of Climate Risks for Different Water Sources

Water Source	Climate Risk	Vulnerability	Severity	Frequency	Impacts
Rivers	Drought	High	Severe	Frequent	Reduced water flow Dryness of rivers Encroachment of riparian land

Water Source	Climate Risk	Vulnerability	Severity	Frequency	Impacts
Springs	Reduced rainfall amounts	Moderate	Moderate	Occasional	Reduced recharge Change in water quality Encroachment of the springs and watersheds
Groundwater	Over-extraction	High	Severe	Frequent	Reduced recharge rates Dryness of water sources Resource use conflicts
Surface water	Contamination	Moderate	Severe	Occasional	Rise in waterborne diseases No value for investments Biodiversity loss Death of aquatic fauna

This matrix highlights the need for adaptive measures such as constructing sand dams, promoting rainwater harvesting, and implementing water conservation strategies. These efforts can mitigate risks and enhance resilience in Makueni County.

Assessment of Gender-specific climate induced vulnerabilities

The County faces significant challenges arising from climate variability and change which disproportionately affect men and women due to existing social, economic and cultural inequalities. An assessment of gender-specific climate-induced vulnerabilities reveals that women and other marginalized groups particularly bear the brunt of these impacts owing to their traditional roles in securing water, food and fuel for their households. As a matter of fact, prolonged droughts, erratic rainfall and increasing temperatures intensify water scarcity and food insecurity thus placing additional burdens on women and girls who must travel longer distances to access essential resources.

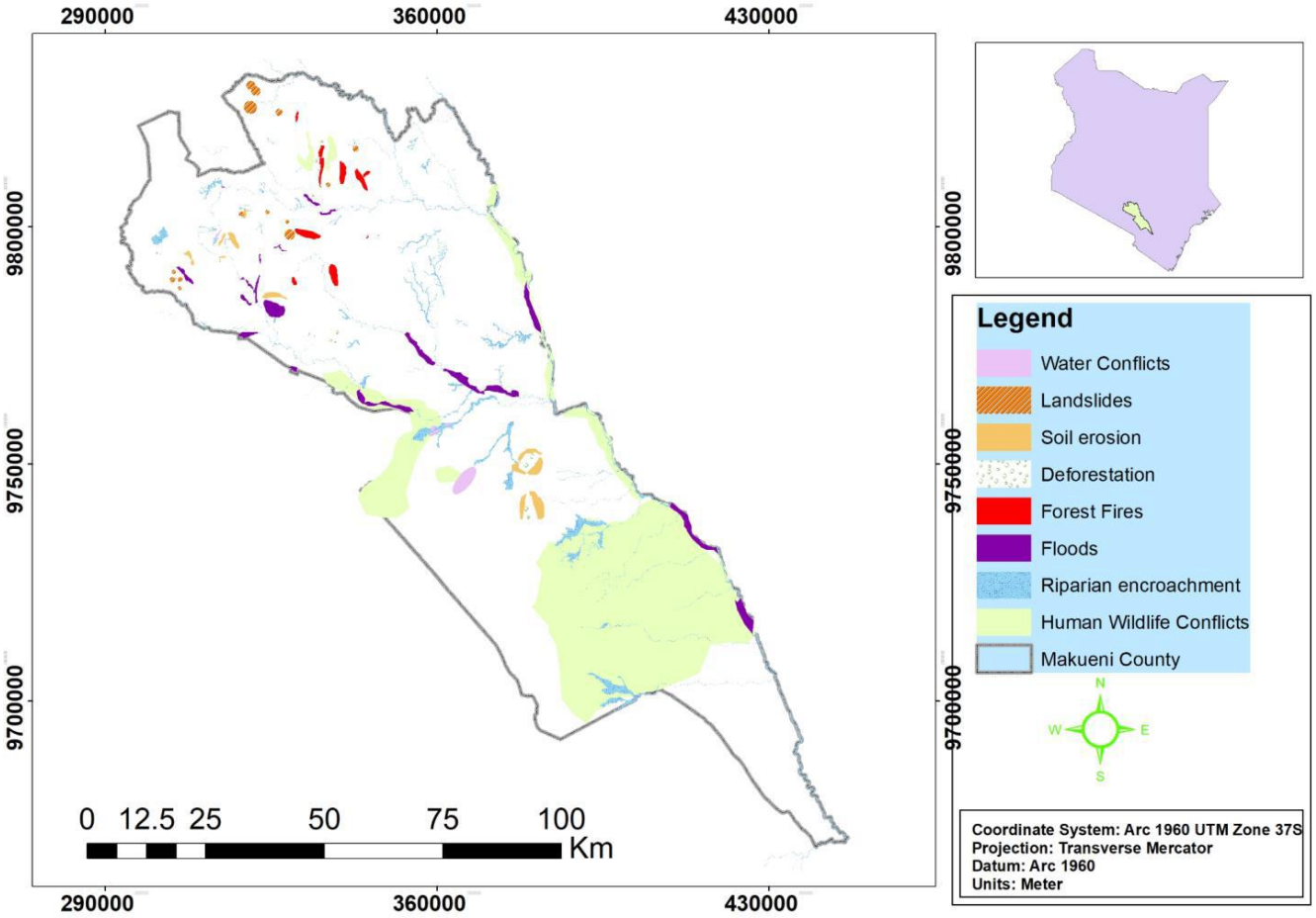
Additionally, limited access to land ownership, credit and decision-making platforms restricts women's' capacity to adapt to changing climate conditions effectively. Men, on the other hand, face vulnerabilities linked to the loss of livelihoods in agriculture and livestock production, often leading to increased rural-to-urban migration in search of alternative income sources. This calls for adoption of gender-responsive climate adaptation strategies that acknowledge various differentiated vulnerabilities, promote equitable access to resources and actively involve women, men and special interest groups in climate resilience planning and decision-making processes in the County.

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

Makueni County faces challenges related to climate variability and water security, which directly impact its economic sustainability.

Table 18:County Climate Risks And Hazards

Risk	Likelihood	Impact on WASH Infrastructure	Economic Cost	Overall Rank
1. Drought	Very High (frequent)	Severe water scarcity; Reduced borehole yield; Drying up of shallow wells, rivers, dams; Increased water trucking costs.	High loss of agricultural productivity, livestock deaths, emergency water supply costs.	**1**
2. Erratic Rainfall	High (frequent)	Unreliable water supply Reduced rainwater harvesting Disrupted water resource planning.	Medium to high agriculture losses, Inefficiency in water infrastructure investments.	**2**
3. Flooding	Medium (localized)	Damage to water points, latrines, sewer systems Contamination of water sources; Collapsing of WASH infrastructure; Latrines, water pans, water points etc.	High infrastructure repairs costs, Public health costs from disease outbreaks.	**3**
4. Extreme Temperatures	Medium (seasonal)	Evaporation of water in open water sources, Strain on pipe networks, Accelerated wear on materials.	Medium-increased maintenance costs, Reduced water availability.	**4**
5. Landslides/Soil Erosion	Low–Medium (specific zones)	Disruption of water catchment areas Sedimentation in water storage systems.	Medium (desilting costs, rehabilitation of damaged zones).	**5**



Map 4:County Climate Risks And Hazards

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

To enhance water security in Makueni County, sector-specific adaptation and mitigation measures can be identified and prioritized based on their cost-effectiveness.

Adaptation Measures

1. Rainwater Harvesting: Implementing systems to collect and store rainwater for agricultural and domestic use.
2. Water-Efficient Irrigation: Promoting drip irrigation and other efficient irrigation techniques to reduce water wastage.
3. Drought-Resistant Crops: Encouraging the cultivation of crops that require less water and are resilient to changing rainfall patterns.
4. Community Water Storage: Building reservoirs and tanks to store water during rainy seasons for use during droughts.

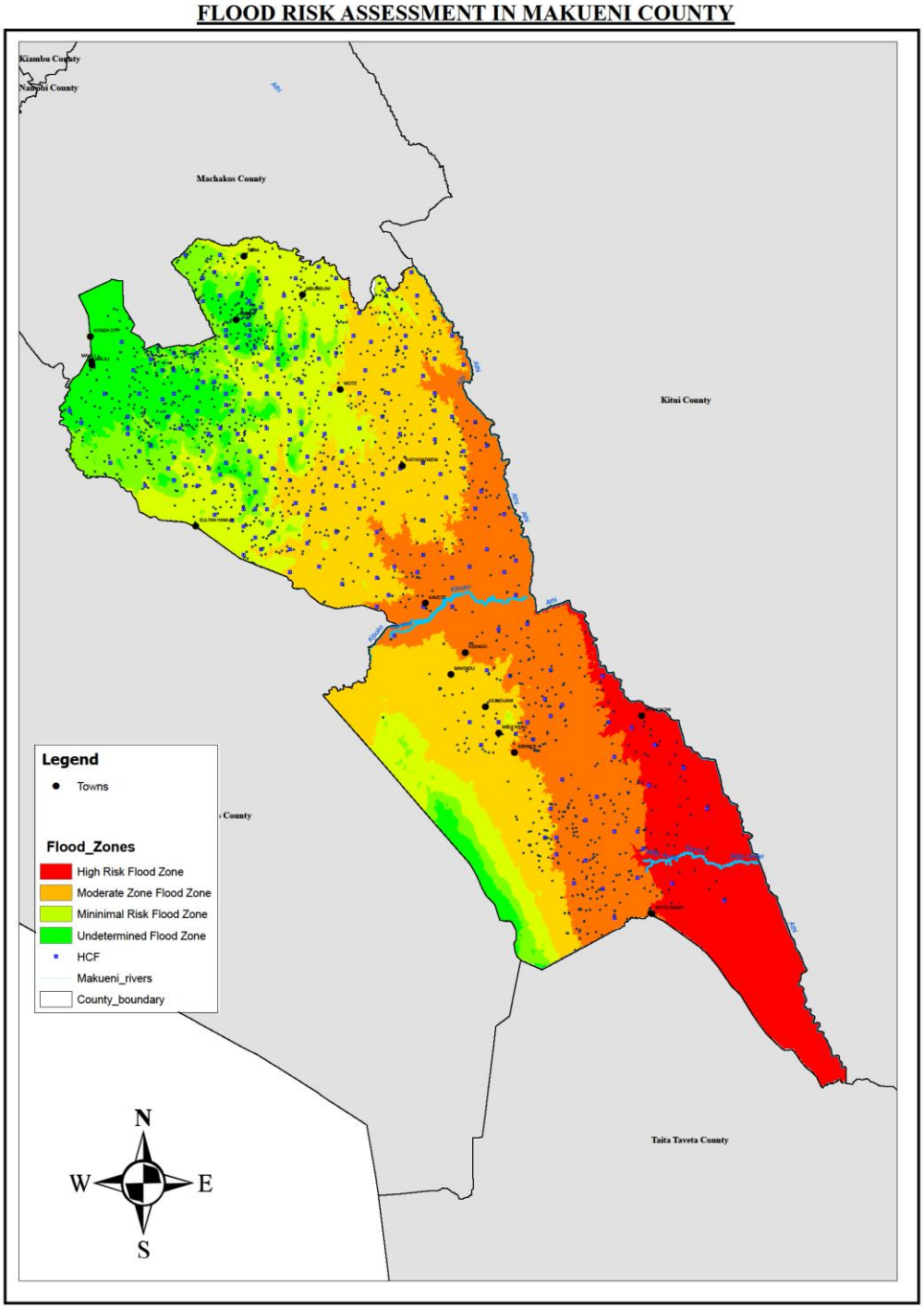
Mitigation Measures

1. Reforestation and Agroforestry: Planting trees to improve water retention in the soil and reduce runoff.
2. Soil Conservation Practices: Using terracing and contour farming to prevent soil erosion and enhance water infiltration.
3. Wastewater Recycling: Treating and reusing wastewater for irrigation and other non-potable uses.
4. Energy-Efficient Water Pumps: Transitioning to solar-powered or energy-efficient water pumps to reduce greenhouse gas emissions.

Cost-Benefit Analysis

To prioritize these measures:

1. Economic Costs: Assess the initial investment, maintenance, and operational costs.
2. Economic Benefits: Evaluate potential savings, increased agricultural productivity, and reduced water scarcity.
3. Social Benefits: Consider improved livelihoods, health outcomes, and community resilience.
4. Environmental Benefits: Account for reduced soil erosion, improved biodiversity, and lower carbon emissions.



Map 5:Flood Risk Assessment In Makueni County

1.2.5 Overview of planned and ongoing interventions aimed at enhancing water's role in the economy

Summary of existing programs supporting water-driven economic development.

To catalyze sustainable socio-economic development through enhanced water security, Makueni County has outlined a comprehensive set of planned interventions targeting water-driven growth. Currently,

there are 165 ongoing interventions. These initiatives encompass the construction and rehabilitation of water infrastructure, including earth dams, boreholes, pipelines, water pans and solar-powered pumping systems. The interventions are strategically distributed across various sub-counties, addressing domestic, livestock and irrigation needs. The planned activities aim to increase water access, improve agricultural productivity and enhance climate resilience among communities.

Makueni County has implemented several programs to support water-driven economic development:

1. **Water Sector Development Goals**: By 2027, the county aims to invest KSh 4.8 billion to achieve 70% universal water supply for over 1 million residents. This includes reducing the distance to water points from 4 km to 2 km and increasing daily water coverage.
2. **Last Mile Water Connectivity Program** – *Kunyaaikya Kiwu Nduani na Misyini* – The county is implementing strategic interventions to enhance access to clean and reliable water. Key initiatives include mapping and extending critical water pipelines to schools, health centers, markets, and households, ensuring that essential services have a consistent supply. Additionally, the county has prioritized the distribution of two major water projects per ward (one per sub-ward) to effectively address localized water challenges. A total of 500 households will benefit from this intervention, with 12 kilometers of pipeline being constructed per ward.
3. **Climate Resilience Projects**: Co-funded by the World Bank, these projects include solar-powered water systems and sand dams to provide clean water for domestic use and irrigation. They aim to enhance community resilience to drought and climate change.

These programs reflect the county's commitment to improving water access and leveraging it for sustainable development.

Overview of planned and ongoing climate-resilient interventions supporting water-driven economic development.

Makueni County has been proactive in implementing climate-resilient interventions aimed at supporting water-driven economic development. Here's an overview of some key initiatives and strategies:

1. **Participatory Climate Risk Assessment (PCRA):** Makueni County conducted a comprehensive climate risk assessment to identify vulnerabilities and prioritized climate adaptation measures. This process engaged local stakeholders to ensure that interventions are community-driven and context-specific.
2. **County Climate Change Fund (CCCF):** The county has allocated 1% of its development budget to climate change initiatives. This fund supports locally-led adaptation projects, such as water harvesting, irrigation systems, and climate-smart agriculture.
3. **Climate Change Action Plan (2023–2027):** This plan outlines strategies to mitigate climate risks and enhance resilience. It emphasizes sustainable water management, reforestation, and the promotion of renewable energy sources.
4. **Partnerships for Climate Adaptation:** Collaborations with organizations like UKAID, Christian Aid, and the Adaptation Consortium have enabled Makueni to access funding and

technical expertise. These partnerships have supported the integration of climate adaptation into county planning and budgeting.

5. **Enhanced Climate Information Services (CIS):** The county has improved access to climate data, enabling farmers and other stakeholders to make informed decisions about water use and crop planning.

These interventions are not only addressing local challenges but also serve as replicable models for other regions. For instance; the CCCF model can be adopted by other Counties to ensure sustainable financing for climate action and enhanced CIS can be scaled to other sectors, such as disaster management and urban planning.

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

Makueni County has been actively working on projects and partnerships to enhance the water-economy nexus. Here are some initiatives and ideas that could be explored further:

Current Projects

1) **Water Enhancement Projects such as in Wote and Mavindini**: Distribution of water from Kaiti 2 sand dam to Wote town and surrounding areas; and Construction of a sump and installation of solar pumping systems at Athi River intake to provide clean water for domestic use and irrigation; and Mutyambua Borehole Project which is producing 50,000 liters per hour, serving households, schools, and health centers
2) **Last Mile Water Connectivity Program**: Solar-powered borehole projects supplying clean water to households and schools across various villages.
3) **Collaborations with NGOs**: Partnerships with organizations like World Vision, Water Mission Kenya, and Welt Hunger Hilfe to alleviate water shortages and improve irrigation systems.

Potential Partnerships

1) **Private Sector Involvement**: Engagement of private companies to invest in water infrastructure and irrigation technologies; and Development of public-private partnerships for sustainable water and sanitation management.
2) **Community-Based Models**: Expansion of community-owned water projects to ensure local participation and accountability and training of communities on efficient water usage and conservation techniques.
3) **Research and Innovation**: Collaboration with universities and research institutions to develop innovative water solutions; and Piloting projects for water recycling and desalination technologies.
4) **Climate Resilience Programs**: Partnerships with international organizations to fund climate-resilient water systems; and Implementation of programs towards mitigation of the impacts of drought and water scarcity.

2.0. WATER, SANITATION, AND HYGIENE SERVICES COVERAGE STATUS

2.1 County Water Resources Endowment

2.1.1 Overview of available water sources (surface water, groundwater, rainfall)

Inventory of water resources and their capacity.

Makueni County is endowed with various water resources that include surface water, groundwater and rainfall. These water resources face considerable challenges due to climate change, deforestation and a growing population. The county's water resources are primarily supported by six main watersheds: Kaiti, Thwake, Kikuu, Makindu/Kiboko/Muooni, Kibwezi/Thange and Kambu/Mtito Andei. These watersheds sustain various water catchment areas, including forests, agricultural land, and rangelands. The county has 150.2 km² of gazetted forests and 177.88 km² of non-gazetted county forests, with arable land covering 5,042.7 km², while non-arable land extends across 1,762.71 km². Additionally, bushland covers approximately 3,938 km², accounting for 48% of the county's total land area.

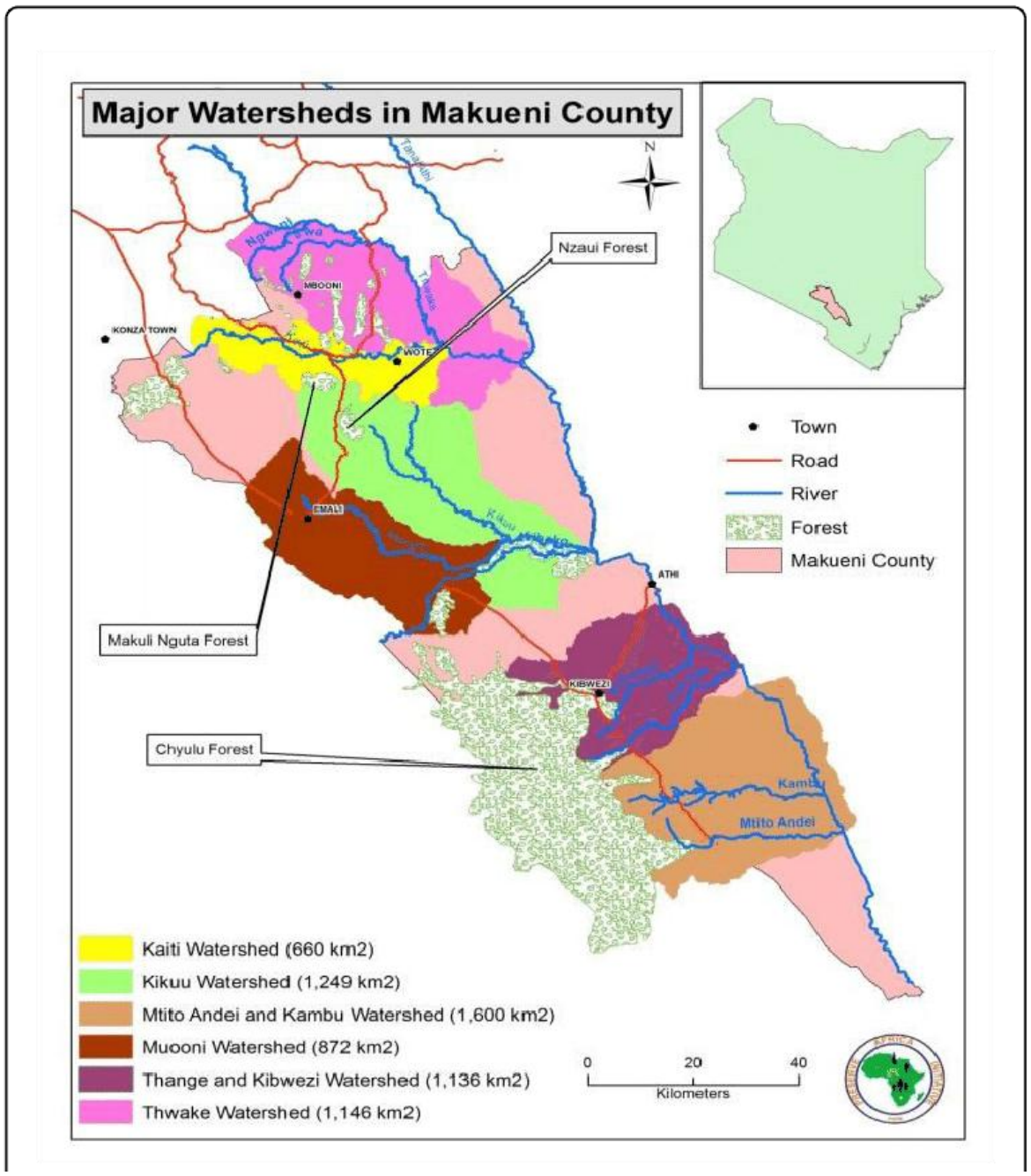
Table 19 below summarizes the county's main water sources and their estimated capacities:

Table 19: County's Main Water Sources and Their Estimated Capacities

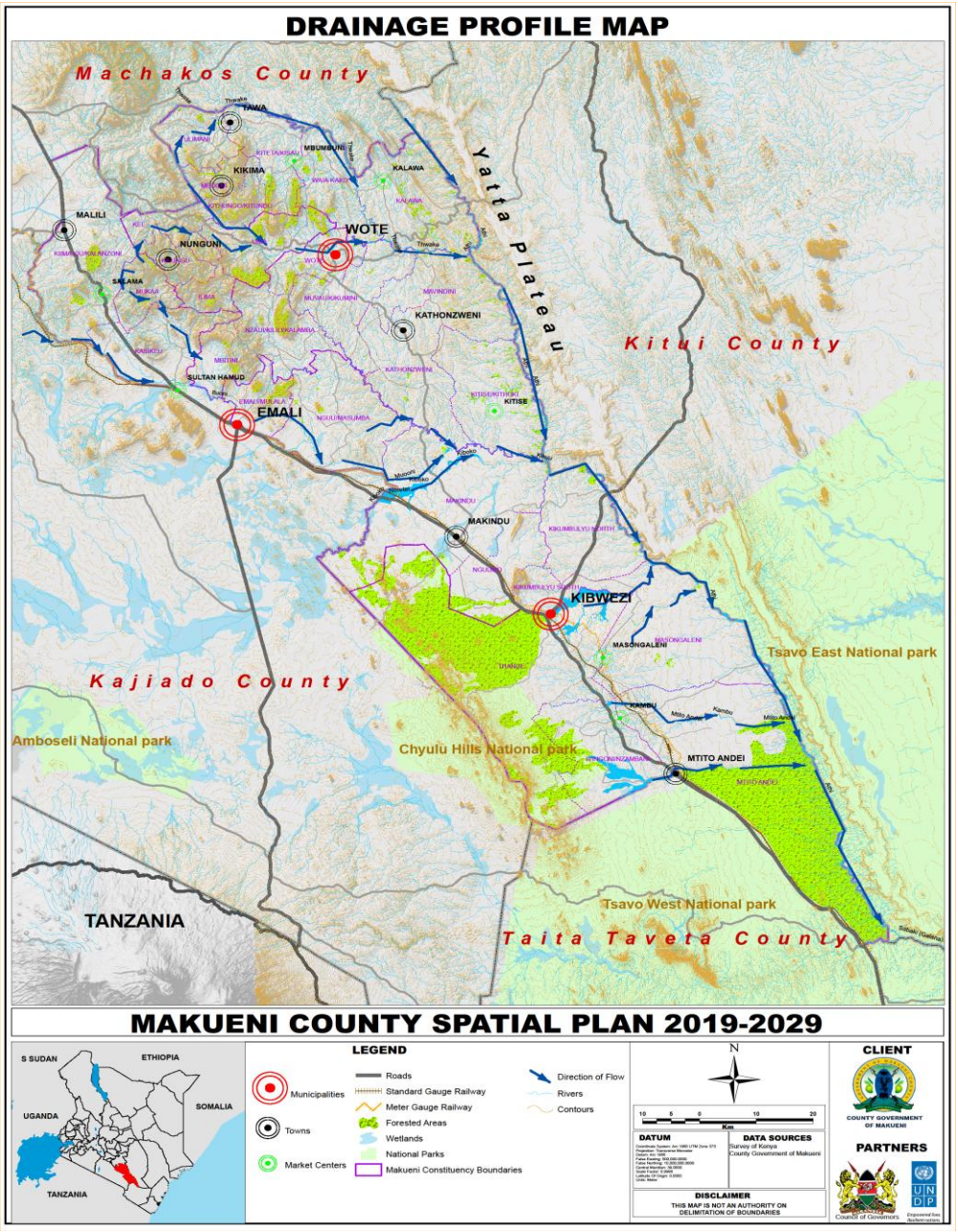
Types of water source	Source Type	Capacity (m3/day)
Boreholes	Ground water	15,918
Shallow Wells	Ground water	1,868
Water Pans/ Dams	Surface water	10,662
Springs	Surface water	7,644
River Abstractions	Surface water	5,430
Total		**41,522**

Earth dams and pans are highly affected by drought and they can sustainably produce 2,506 M^3/day during the dry seasons lowering the overall daily water production to 33,366 M^3.

Spatial distribution of water resources across the county.

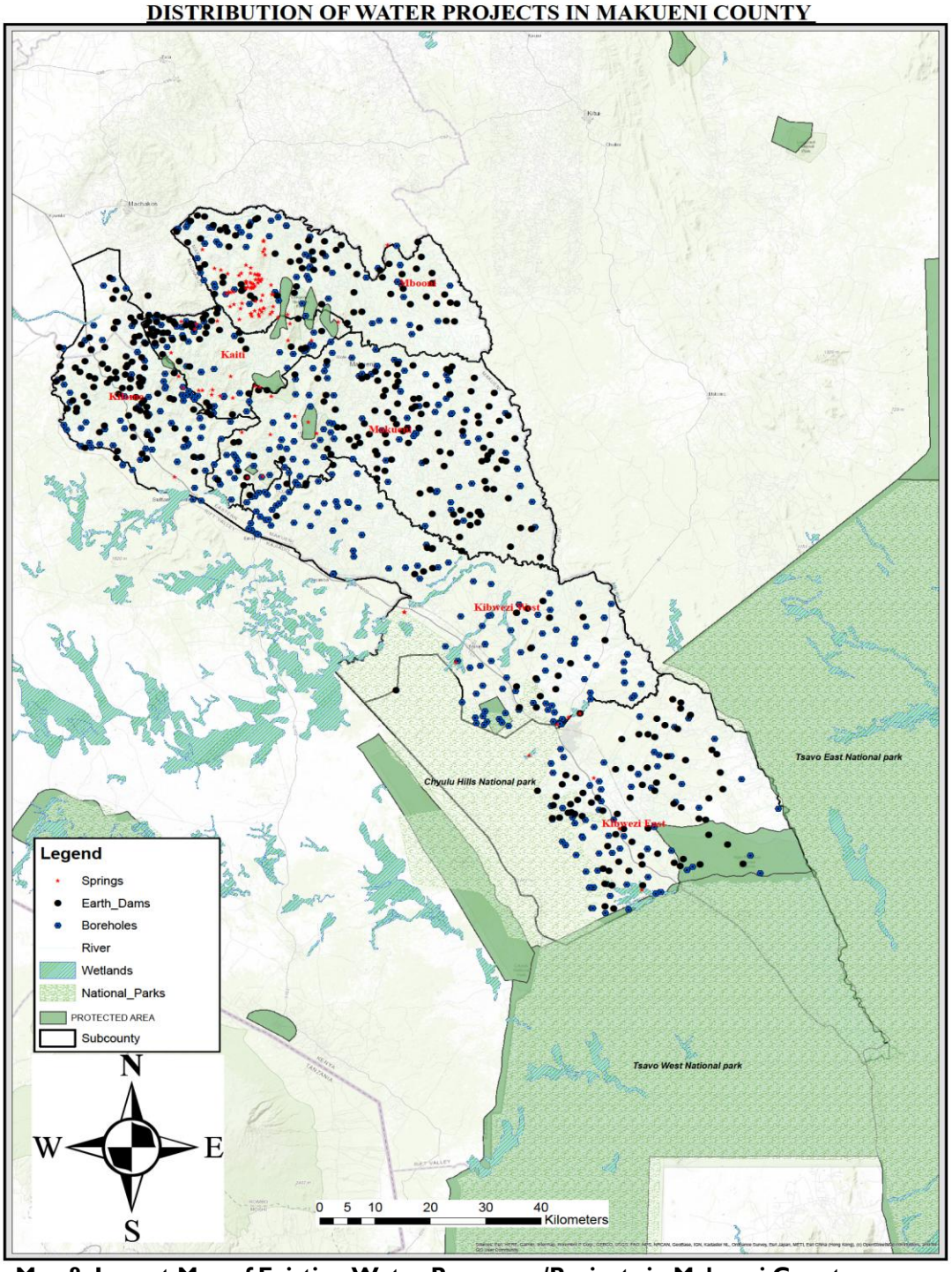


Map 6: Major Water Sheds in Makueni County



Map 7:Drainage Profile for Makueni County

The County has two types of water resources i.e., surface water and ground water as detailed in the sections below. The map below shows the surface and ground water resources in Makueni County.



Map 8: Layout Map of Existing Water Resources/Projects in Makueni County

Surface Water

Surface water in Makueni County is primarily sourced from the Athi and Kibwezi rivers which are the only permanent rivers. Smaller rivers such as Kaiti, Thwake, Thange, Kikuu and Muooni also contribute to the county's water supply though they are seasonal and hence cannot meet the rising water demand. In response to the unreliable surface water sources, the county has constructed several dams and water

pans for irrigation and domestic use. However, these water storage facilities remain limited in capacity, especially in the face of increasing climate variability. Table 16 summarizes the primary type of surface water resources in the County:

Table 20: Summary of the Type of Surface Water Resources in Makueni County

Water Resources	Type	Current Condition
Surface Water	Rivers	a) The Athi River and Kibwezi River are the main rivers flowing through the county, which serve as crucial water sources for various purposes, including domestic use, agriculture, and industry. However, their flow is seasonal and often inadequate to meet the water needs of the population. b) While these two rivers are the main rivers, there are also several smaller rivers and streams that flow through the county, particularly in the hilly regions. These include Kaiti River, Thwake River, Kamunyii River, Kikaloni River etc c) Based on the 2019 census report, there were about 243, 979 households and about 29.1% of them source water from the streams and rivers.
	Dams	a) Several dams have been constructed to store water for various purposes, including irrigation and domestic use. However, due to climate variability and increasing water demand, these dams often face challenges in meeting the needs of the growing population. b) Most of these are sand dams and include Kaiti, Usi Unene, Kaluku, Ilengeni, Kwa Ngesu, Kyambondo, Taa wa Kiukuni, Mathemu, Kwa Ndithi, Kwa Kiwu, Ukava wa Kithoni, Kyanzonzo, Matiliku, Kwa Kitengi, Kwa Ndumbu, Kitunthi, Kalindiloni, Upper Kiboko, Lower Kiboko, Kaamuka, Kwa Kitungu, Ikolya, Nzeveni (Kwa Kalu), Upper Mbole.etc. c) Currently, Thwake Dam is under construction and is meant to be a multipurpose dam that provides drinking water, agricultural irrigation water, hydropower, and other water supply infrastructure. It will supply water to serve rural parts of lower eastern counties of Makueni, Kitui and parts of Machakos. d) Based on the 2019 census, 2.7% of the households get water from the dams.

The county relies on the following water resources: Surface water sources form the primary source of water in Makueni County. The main surface water sources include rivers, dams and water pans.

Table 21:Surface water sources form the primary source of water in Makueni County

Sub-County	Earth Dams	Rock Catchments	Sand Dams	Shallow Wells	Water Pans	Rivers and Streams
Mbooni	62	1	27	22	-	18
Kilome	54	-	63	10	1	17
Kaiti	40	3	104	9	6	29
Makueni	10	9	39	56	146	2
Kibwezi West	72	20	35	25	18	6
Kibwezi East	71	8	8	62	13	2
Total	**309**	**41**	**276**	**184**	**184**	**74**

Groundwater Resources

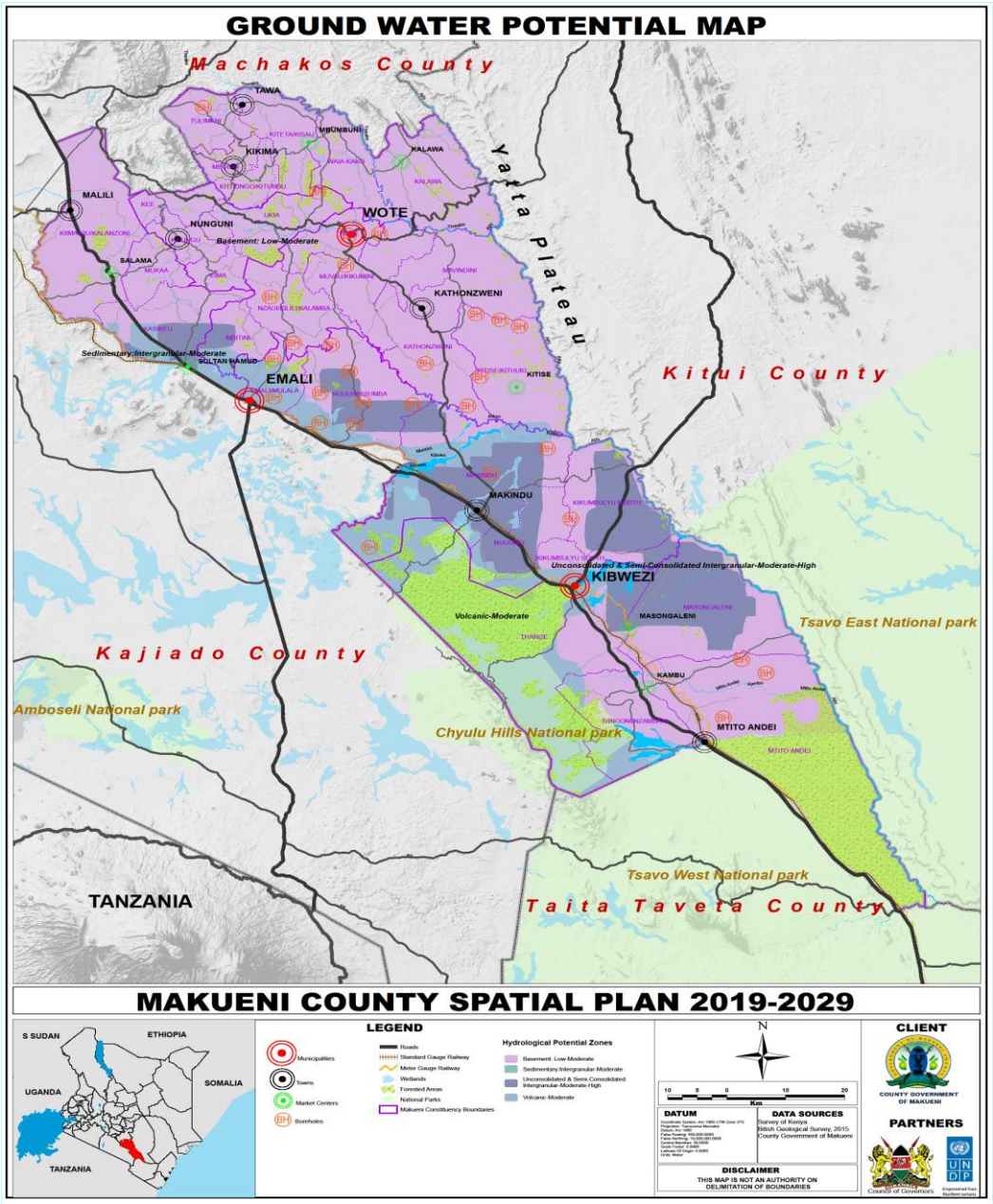
The county has several ground water sources including aquifers and boreholes. The groundwater aquifers have limited potential due to over-abstraction and poor management. 11.8% of the households get water from boreholes based on the 2019 census but their potential is limited due to over-abstraction and poor management.

Based on the 2019 census, 2.6% of the households get water from the protected springs. These include Simba, Kiboko, Umani and Kibwezi springs.

Many households and communities rely on boreholes for water supply, but the quality and quantity of groundwater can vary significantly. Based on the 2019 census, 11.8% of the households get water from boreholes. A summary of groundwater resources in Makueni County is provided in **Error! Reference s ource not found.**22

Table 22:Summary Of Groundwater Resources In Makueni County

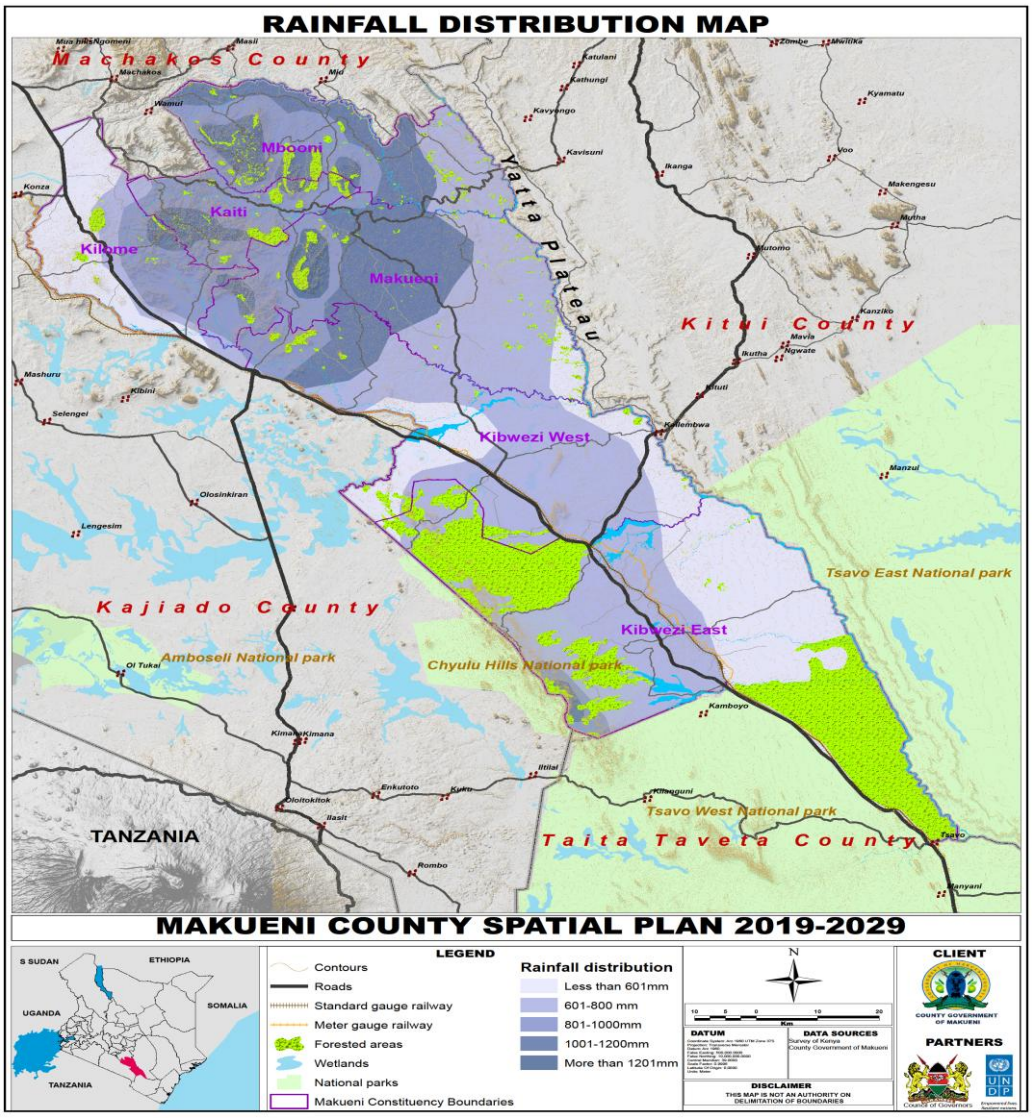
Sub-County	Boreholes	Water Springs	Shallow Wells
Mbooni	49	35	22
Kilome	76	4	10
Kaiti	40	8	9
Makueni	119	12	56
Kibwezi West	117	5	25
Kibwezi East	71	3	62
Total	**472**	**67**	**184**



Map 9:Ground water resources in Makueni County.

Rainfall

Rainwater harvesting is a central strategy in addressing water scarcity in the county. The county's bi-modal rainfall pattern - Long Rains (March–May) and Short Rains (October–December) -plays a crucial role in shaping rainwater harvesting strategies. Given its diverse agro-ecological zones, ranging from upper areas receiving 900mm–1100mm of rainfall annually to lower zones that get 450mm–700mm, rainwater harvesting becomes a vital intervention for water security. The County Government promotes holistic water harvesting aiming to increase access to potable water through investments in sand dams, earth dams, rock and roof catchments and road surface runoff harvesting.



Map 10 : Rainfall distribution in Makueni County.

Water resources shared across counties, including water allocation criteria and agreements.

Makueni County has two water sources shared across counties: River Athi and Mzima Springs. Despite their critical importance, there are currently no formal agreements governing the allocation or management of either resource. Mzima Springs, although located within the county, benefits coastal counties such as Mombasa, Kwale, and Taita Taveta. River Athi serves as a vital source of water for both domestic and agricultural use within the county. The County Government, in collaboration with local stakeholders, has implemented several projects that tap water from the river to support irrigation and household water supply through consensual modalities and community led initiatives. For Makueni,

Machakos and Kitui counties, they operate under the South Eastern Kenya Economic Block (SEKEB) agreement.

2.1.2 Current water abstraction and usage patterns

Assessment of existing water extraction and utilization

Water extraction in Makueni County primarily serves domestic and agricultural needs, supported by a diverse range of sources. Boreholes form the backbone of the county's water supply, with 472 installations providing the highest daily capacity of 15,918 M^3, making them essential for households, livestock, and irrigation. Springs and shallow wells—105 and 142 respectively—contribute daily outputs of 7,644 M^3 and 1,868 M^3, further supporting domestic and agricultural use. River abstractions, though fewer at 74, offer a notable 5,430 M^3 per day. Water pans and dams, totaling 493, collectively provide 10,662 M^3/day; however, their reliability is significantly compromised during prolonged droughts. Only 57 of these are resilient to climate stress, with a combined output of 2,506 M^3/day, highlighting their vulnerability to climate change. Overall, the county extracts approximately 41,522 M^3 of water daily, but this drops to just 33,366 M^3 during dry periods. While the existing water infrastructure is moderately diversified, it remains under pressure, particularly during times of climatic stress, underscoring the urgent need for climate-resilient strategies and sustainable water resource development.

Table 23:Water Abstraction Estimates

Water Source Type	Number	Main Use	Capacity (m3/day)
Boreholes	472	Domestic/ Agricultural	15,918
Shallow Wells	142	Domestic/ Agricultural	1,868
Water Pans/ Dams	493	Domestic/ Agricultural	10,662
Springs	105	Domestic/ Agricultural	7,644
River Abstractions	74	Domestic/ Agricultural	5,430
Total			**41,522**

Urban Areas Water Production

The urban areas in the County include Wote, Emali, Makindu, Sultan Hamud, Kibwezi, Mtito Andei, Kikima, Kiboko and Nunguni. Urban areas like Wote, Emali and Makindu have relatively better access to piped water supply, though coverage may not be universal, especially in informal settlements.

The primary water service providers which serve the urban areas in Makueni County are:

- **Wote Water and Sewerage Company Limited (WOWASCO)**: Serves the Wote Municipality and surrounding areas.
- **Kibwezi Makindu Water and Sanitation Company Limited (KIBMAWASCO):** Provides water services to the towns of Kibwezi, Makindu, Kambu, and Mtito Andei, along with their surrounding areas.

These companies are responsible for the production, treatment, distribution, and maintenance of water supply systems within their respective service areas.

The existing water supply schemes for WOWASCO and KIBMAWASCO are presented in the ***Error! Reference source not found.*** *24* below;

Table 24:Existing Water Supply Schemes under KIBMAWASCO and WOWASCO Coverage

No.	Water Service Provider, WSP	Existing Water Supply Schemes under the WSP	Households with access to piped water by the WSP in the year 2022
1.	Kibwezi - Makindu Water and Sanitation Company Ltd (KIMAWASCO)	**Kibwezi Water Supply Scheme;** a) It gets water from Umani Intake which is a spring. b) It has an approximate production capacity of 2,061 m³. c) A total pipeline network of about 174km within Kibwezi. d) A total main storage capacity of 1,550m³	• 8,172 No. of registered households with piped water • 5,282 No. of active households with piped water
		Makindu Water Supply Scheme a) It gets water from a spring at Kwa Venge intake b) It has an approximate production capacity of 1,706 m³. c) A total pipeline network of about 49.9km within Makindu. d) A total main storage capacity of 2,450m³.	
		Kambu Water Project a) It has about 6km of pipeline network within Kambu Town. b) It has a total main storage capacity of 230m³ but 200m³ is not in use.	
		Kambu - Kitengei Water Project a) It has about 31km of pipeline network within Kambu Town. b) It has a total storage capacity of 160m³ but they are not in use.	
		DWA (Kivungoni) - Kyumani Water Project a) It has about 31.4km of pipeline network within Lower Masongaleni Ward. b) It has a 100m³ Masonry Tank, which is in use.	
		Kilui Water Project It has about 17.2km of pipeline network within Upper Ngandani Sub-Ward.	
2.	Wote Water and Sanitation	WOWASCO has an extensive pipeline network of 123km with 4 main water supply schemes. These include **Mwaani Water Supply Scheme**	• 2,818 No. of registered

No.	Water Service Provider, WSP	Existing Water Supply Schemes under the WSP	Households with access to piped water by the WSP in the year 2022
	Company Ltd (WOWASCO)	a) It has 3 boreholes which have a total yield 43m³/ hr. i.e., 15m³/hr., 9m³/hr. and 18m³/hr. b) Water from the boreholes is treated by chlorination. c) It has about a total length of 21km for rising mains. d) It has a total distribution network of 49km which serve Mwaani, Mwambani and part of Wote Town (Return). e) A total main storage capacity of 525m³. It shares storage with Kamunyolo Earth dam water supply scheme.	households with piped water • 1,841 No. of active households with piped water
		Mwaani Booster a) The system sources water from 1 no. borehole with a capacity of 55m3 b) Grid power and hybrid solar are the sources of energy. c) It operates on 16 hours of supply to a 20 km² area. d) It has a transmission of 2No. i.e. 6" and 4" rising mains and storage of 395m³	
		Kamunyolo Earth Dam Water supply scheme. a) It gets water from an earth dam. b) It has a rising main of 5.5km. c) It has a treatment capacity of 40m³/hr. through 2 No. CFU d) It has a distribution network of 23 km which serves Mwambani, Kwa Nguluwe and Wote Town. e) It has a total storage capacity of 525m³ which is shared with Mwaani Water Supply Scheme.	
		Kaiti I Water Supply Scheme a) It gets water from a sand dam across Kaiti River. b) It has a CFU treatment system with a total capacity 40m³. c) It has a total rising main of 5km. d) It has a total main storage capacity of 375m³ i.e., 225m³ and 150m³ e) It has a distribution network of about 37km which serves Wote Town.	
		Kiti Kyumu Water Supply Scheme a) It gets water from a borehole with a yield of 16m³/hr. b) Water is treated through chlorination. c) It has a rising main of 13km	

No.	Water Service Provider, WSP	Existing Water Supply Schemes under the WSP	Households with access to piped water by the WSP in the year 2022
		d) It has a distribution network of 27km which serve villages i.e., Itande, Mlolongo and Malivani in Wote Nziu Ward. e) It has a total main storage capacity of 200m³.	
		Swaa Mukuyuni Water Supply Scheme a) It gets water from a sand dam across Isuuni River with a capacity of 20m³/hr. b) It has a rising main of about 1km. c) It has a distribution network of about 20km which serve Ukia market and Mukuyuni Market. d) It has a total main storage capacity of 100m³.	
		Kilala Water Supply Scheme a) It gets water from a borehole with a yield of 11m³/hr. b) Water is treated through chlorination. c) It has a rising main of 4.5km d) It has a distribution network of 31 km which serves Kilala market, Ukia and Itangini. e) It has a total storage capacity of 250m³.	

Rural Areas Water Production

Rural areas, particularly in arid and semi-arid regions, face significant challenges in accessing safe and reliable water. Many rely on sources like rivers, boreholes, and rain harvesting, which are often insufficient and prone to contamination.

In efforts to enhance water governance, Makueni county has an established Makueni Rural Water Board (MARUWAB) which oversights rural water service provision which is often provided through a combination of:

a) **Community-Based Organizations (CBOs):** Many rural areas in the County have CBOs responsible for managing and maintaining local water sources such as boreholes, wells, and rainwater harvesting systems.

b) **Water User Associations (WUAs):** These are community-based organizations that manage and operate water supply systems, often with support from government agencies and NGOs.

c) **Government Agencies:** The County Government of Makueni plays a crucial role in supporting rural water supply through initiatives like:
   i. Rural Water Supply and Sanitation Program (RWSS)
   ii. Community-Driven Development (CDD) projects

d) **Mbooni Water and Sanitation Company Ltd (MBONWASCO):** Serves rural areas within Mbooni sub county.

Table 25: Rural Water Service Providers

No.	Water Service Provider, WSP	Existing Water Supply Schemes under the WSP	Households with access to piped water by the WSP in the year 2022
1.	Mbooni Water and Sanitation Company Ltd (MBONWASCO)	MBONWASCO has three (3) water sources and a borehole that is not operational due to low yield and breakdown. The company estimates to have a production capacity ranging from 100 to 216m³/day from the 3 water sources. The three main water sources include: **Mbumbuni Water Supply Scheme** a) It's source of water is Kinze earth dam. b) Water is treated at Kinze then pumped to Ngaa, Muthwani and Mbumbuni. It serves Mbumbuni-Market, Kisau Girls and Lungu area c) The water is treated through CFU which has a design capacity of 10m³/hr. but operates at 7m³/hr.	• 1,354 No. of registered households with piped water • 816 No. of active households with piped water
		Mukundi Water Supply Scheme a) It's water source is intake works along River Mukundi b) It has 1No. 100 m³ masonry distribution tank c) It has inadequate infrastructure; lack of treatment works, inadequate storage facilities and distribution pipelines (limited coverage). d) It currently serves Ngoni and Mangani.	
		Mulima Water Supply Scheme a) It gets water from a river and flows by gravity. b) It supplies Mavindu, Itetani, Kalawani, Emale area. c) Water is not treated. d) Most lines don't get water due to clogged pipelines and inadequate water supply.	

Water Deficit

With the current production capacity of 33,366m^3 Makueni County will have a water deficit of 32,298 m^3/day, 31,350m^3/day and 20,265 m^3/day for the current, initial and future years. A summary of the water deficit for the current, initial and current years is summarized in table 26.

Table 26: Makueni County Water Deficit

	Current Year (2024)	Initial Year (2025)	Future Year (2030)
Water Demand (m^3/day)	65,664	66,350	75,265
Water Production Capacity (m^3/day)	33,366	35,000*	55,000*
Water Deficit (m^3/day)	32,298	31,350	20,265

There are significant disparities in water access between urban and rural areas. In urban regions, only 6% of households have access to safely managed drinking water services 30% have access to limited water services, a notable 22% lack any form of improved service, relying on surface water from rivers, ponds, and canals. The presence of urban water service providers like Wote Water and Sewerage Company (WOWASCO) and Kibwezi-Makindu Water and Sanitation Company (KIBMAWASCO) has led to relatively better infrastructure in towns such as Wote, Emali, and Makindu, though coverage remains inconsistent.

In contrast, rural areas experience even greater challenges. Only 2% of rural households across the county have safely managed water services, while 35% depend on unimproved sources or surface water. Rural water access is often provided through community-managed systems such as Community-Based Organizations (CBOs) and Water User Associations (WUAs), supported by the county government and other stakeholders. These systems frequently suffer from issues like inadequate infrastructure, lack of water treatment and insufficient distribution networks. Mbooni Water and Sanitation Company (MBONWASCO) is the main rural water service provider but operates with limited capacity and frequently non-operational sources, which limits consistent service delivery.

Overall, Makueni County faces a significant water deficit, with a daily shortfall of over 35,000 cubic meters against a current production capacity of 30,000 cubic meters. This deficit is projected to grow in the coming years if no substantial investments are made to enhance water infrastructure and improve access to safe drinking water. The urban-rural divide is marked, with rural households unduly affected by the lack of infrastructure, treatment facilities and financial resources. Addressing these gaps requires a coordinated approach that includes expanding piped water networks, rehabilitating non-functional systems and scaling up investments in water harvesting and treatment technologies

Water Demand

Water Demand Projections

The water demand estimates are based on the following categories of water user types:

a) Domestic demand;
b) Institutional demand (mainly schools and health facilities);
c) Commercial demand.
d) Irrigation water demand

Based on the unit consumption rates provided in the MWI Practice Manual 2005, The estimation of water demand has been carried out alongside the projected population in respect of the design intervals i.e., current (2024), initial (2025) and future (2030) design years. Where necessary, the rates have been modified to suit the characteristics of the scheme's level of service (ward). Other considerations have been taken in account of the span, land potential, and water supply coverage of the supply area.

The water demand projections are as summarized in the **Error! Reference source not found.**7 b elow.

Table 27: Total Water Demand For Makueni County In Wards

Sub County	Ward	Total Water Demand, m³/day		
		Current, 2024	Initial, 2025	Future, 2030
Kaiti	Ukia	1,346.54	1,360.63	1,511.37
	Kee	988.56	999.04	1,331.62
	Ilima	1,619.32	1,636.64	2,083.44
	Kilungu	1,552.34	1,568.98	2,090.52
Kibwezi East	Mtito Andei	1,771.82	1,790.92	2,242.82
	Ivingoni/ Nzambani	1,378.89	1,393.65	1,618.24
	Thange	1,299.22	1,313.32	1,524.52
	Masongaleni	1,271.97	1,285.47	1,494.73
Kibwezi West	Emali/ Mulala	1,039.15	1,050.21	1,224.39
	Nguu/ Masumba	1,123.98	1,135.67	1,309.59
	Kikumbulyu North	814.36	823.14	960.91
	Makindu	1,550.67	1,566.33	1,860.73
	Nguumo	1,163.25	1,175.83	1,372.97
	Kikumbulyu South	1,089.09	1,100.76	1,291.90
Kilome	Kiima Kiu/ Kalanzoni	1,253.59	1,266.94	1,474.05
	Kasikeu	7,644.55	7,727.91	8,158.21
	Mukaa	1,340.64	1,354.76	1,657.09
Makueni	Kitise/ Kithuki	992.26	1,002.60	1,153.80
	Mavindini	4,638.18	4,688.62	4,949.36
	Muvau/ Kikumini	1,062.34	1,073.58	1,246.52
	Kathonzweni	5,665.61	5,727.80	6,049.71

Sub County	Ward	Total Water Demand, m³/day		
		Current, 2024	Initial, 2025	Future, 2030
	Nzaui/ Kilili/ Kalamba	1,989.57	2,010.63	2,503.13
	Mbitini	1,497.87	1,513.85	1,865.27
	Wote	8,590.23	8,663.42	9,042.02
Mbooni	**Kalawa**	1,480.59	1,496.25	1,968.46
	Kako/ Waia	1,251.13	1,264.44	1,676.04
	Kisau/ Kiteta	1,934.05	1,954.73	2,451.58
	Tulimani	1,410.62	1,425.81	1,663.29
	Kithungo/ Kitundu	823.45	832.22	1,003.65
	Mbooni	6,080.34	6,146.14	6,485.73
Total		**65,664.18**	**66,350.28**	**75,265.64**

It is essential to consider how water needs and consumption patterns vary across different social groups and genders. According to desktop reviews and household assessments, women are responsible for the majority of domestic chores including cooking, cleaning and caregiving, which translates to significantly higher water usage. It is estimated that women account for approximately two-thirds of total household water consumption, while men account for only one-third. Furthermore, wealthier households demonstrate higher per capita usage due to access to private connections and water-intensive amenities, whereas lower-income households often rely on communal sources with limited supply and reliability.

Sectoral demand and consumption trends.

Water demand and consumption trends in Makueni County are steadily increasing, reflecting population growth, urbanization and changing socio-economic dynamics. The total daily water demand is projected to rise from 65,664.18 m³ in 2024 to 75,265.64 m³ by 2030. Lower-income households particularly in rural areas, face more acute water access challenges due to limited infrastructure and high dependency on climate-sensitive sources such as water pans and shallow wells. Women and girls disproportionately bear the burden of water collection, often walking long distances, which affects their time for education and income-generating activities. As demand grows, gender-responsive and socially equitable water supply planning is critical to ensure that marginalized groups are not left behind. Strategic investments in water infrastructure, coupled with targeted interventions for vulnerable populations, will be key in meeting future water demands sustainably.

2.1.3 2.1.3. Seasonal variations and climate-related vulnerabilities affecting water supply

Seasonal fluctuations in water availability and their impact on service delivery

The county faces significant challenges in water supply due to seasonal variations and climate-related vulnerabilities. The region experiences two main rainy seasons: the long rains (March to May) and the

short rains (October to December). However, these rains are often erratic and unpredictable, leading to periods of drought and water scarcity.

During the dry seasons, water sources such as streams, seasonal rivers, earth pans and most of springs often dry up or experience reduced flow, affecting both domestic and agricultural water needs. Prolonged droughts, which are becoming more frequent due to climate change, worsen water shortages and strain the county's water infrastructure.

Flooding during intense rainfall events leads to contamination of water sources, posing significant public health risks. Heavy rains cause soil erosion, which accelerates the siltation of water storage facilities such as dams and pans, thereby reducing their storage capacity and limiting water availability. To address this, the constructs silt traps and check dams upstream of major reservoirs to help reduce sediment inflow. However, these structures are not consistently desilted after every rain as required hence some have become silted up and allow sediment to pass into the main reservoirs, undermining their effectiveness.

The rising temperatures and changing rainfall patterns, have a direct impact on the county's water resources. These changes affect groundwater recharge rates and surface water availability, making it difficult to meet the growing water demand.

2.1.4 2.1.4. Water resource challenges.

Makueni County faces several critical threats to water quality and sustainability, many of which are intensified by the impacts of climate change. These include:

Pollution; Agricultural runoff containing pesticides and fertilizers, as well as improper waste disposal, significantly degrade water quality. Contaminants from human settlements and industrial activities further impair the problem, making water unsafe for consumption and harming aquatic ecosystems.

Over-extraction of Water Resources; The increasing demand for water for domestic, agricultural, and industrial purposes has led to over-extraction of both surface and groundwater. This unsustainable use depletes water reserves, reduces river flows and lowers groundwater levels, particularly during prolonged dry periods.

Climate Change Impacts; Erratic rainfall patterns, prolonged droughts, and rising temperatures—hallmarks of climate change have intensified water scarcity in the county. These changes also disrupt groundwater recharge and reduce the availability of surface water, further straining the county's water resources.

Watershed Degradation; Unsustainable land use practices such as deforestation, overgrazing and unregulated farming, have led to the degradation of watersheds. This reduces the capacity of catchment areas to retain and filter water, increasing sedimentation in water bodies and diminishing water availability.

Strategies for conservation and sustainable management

Makueni County has implemented several strategies for conservation and sustainable management, with a focus on restoring degraded landscapes and promoting ecological balance. Here are some key approaches:

Table 23: Strategies for conservation and sustainable management in Makueni County

S/No	Strategy	Description	Status	Effectiveness
1	Forest and Landscape Restoration	The **Forest and Landscape Restoration Implementation Plan (FOLAREP)** aims to restore 100,000 hectares of degraded landscapes by 2030. This includes forests, agricultural lands, rangelands, wetlands, and urban areas.	Progress is ongoing, with initiatives like tree planting, agroforestry and watershed management being actively pursued.	These efforts have improved ecological functionality and provided socio-economic benefits, though challenges like funding and stakeholder coordination remain
2	Sand Conservation and Utilization	The Makueni Sand Conservation and Utilization Authority regulates sand harvesting to prevent environmental degradation and promote sustainable use	Strategies include research, innovation, and community engagement to balance conservation and utilization.	While regulations have curbed illegal sand harvesting, enforcement and public awareness need strengthening
3	Nature-Based Solutions (NBS)	NBS such as reforestation, wetland restoration, and agroforestry are being integrated into climate adaptation strategies.	These solutions are gaining traction, supported by global frameworks like the IUCN Global Standard	NBS offer multiple benefits, including biodiversity conservation, disaster risk reduction, and climate resilience. However, scaling up and integrating them into policies are critical for long-term success.

2.1.5 2.1.5. Climate Change Vulnerability Assessment

Climate hazards affecting water and sanitation.

Makueni County faces several climate hazards that significantly impact water and sanitation systems:

i. **Droughts**: Being an arid and semi-arid region, Makueni frequently experiences prolonged dry spells. These droughts lead to water scarcity, affecting both domestic and agricultural needs.
ii. **Flash Floods**: Despite its arid nature, occasional heavy rains cause flooding, which damages infrastructure, contaminates water sources, and disrupts sanitation systems.
iii. **Rising Temperatures**: Increasing temperatures exacerbate water evaporation rates, further reducing available water resources.
iv. **Landslides and soil erosion**: These disrupt catchment areas and increase sedimentation in water storage facilities.

Efforts like sand dams and water kiosks have been implemented to mitigate these challenges, providing more reliable access to water

Characterization of climate change impact in the county (drought, rainfall, temperatures)

Makueni County, located in Kenya's Arid and Semi-Arid Lands (ASALs), faces significant challenges due to climate change. Here's a summary of its impacts:

i. **Drought;** The County has experienced five major droughts in the last two decades, with the most severe occurring in 2017 affecting over 60% of households. Annual rainfall deficit has increased by 15-20% compared to historical averages. Livestock losses due to drought have risen by 30%, significantly impacting pastoral communities.
ii. **Rainfall Patterns;** Rainfall variability has intensified with annual precipitation ranging between 300mm and 800mm far below the National average. Delayed onset of rains has shortened growing seasons, reducing crop yields by 40% in some areas in medium and lower ecological zones. Flash floods have increased by 25% leading to soil erosion and infrastructure damage.
iii. **Temperature Changes;** Average temperatures have risen by 1.2°C over the last 30 years, accelerating evaporation rates. Water sources such as rivers and boreholes have seen a 20% decline in water levels. Heat stress has reduced crop productivity especially maize by 35% affecting food security.
iv. **Water Scarcity;** Groundwater depletion has increased by 20% affecting borehole reliability. Seasonal rivers are drying up earlier than expected reducing water access for communities.
v. **Soil Degradation;** Soil erosion rates have risen by 25% leading to loss of fertile topsoil. Land degradation has affected 30% of agricultural land reducing productivity.
vi. **Biodiversity Loss;** Deforestation has led to a 15% decline in forest cover over the last decade. Wildlife migration patterns have shifted due to habitat loss and changing temperatures.
vii. **Health Impacts;** Heat-related illnesses have increased by 10% particularly affecting vulnerable populations. Vector-borne diseases like malaria are spreading to new areas due to changing climate conditions.
viii. **Economic Disruptions;** Agricultural losses due to climate change have reduced household incomes by 40%. Livestock productivity has declined by 30% affecting pastoral communities.

Makueni County has taken proactive steps to address these challenges, such as implementing climate change actions and establishing a County Climate Change Fund to support adaptation and resilience projects

Exposure of WASH infrastructure and of water resources

Makueni County faces significant challenges in its Water, Sanitation, and Hygiene (WASH) infrastructure and water resource management. Here's an overview:

Water Resources: The county experiences acute water shortages due to frequent droughts and the degradation of water catchment areas. Efforts have been made to improve water access, such as the development of boreholes, dams, and water pipelines. The county has adopted innovative solutions like automated water dispensing machines and digital billing systems to enhance water governance.

Sanitation Infrastructure: Makueni County has implemented programmes like the "Kutwiikany'a Kiw'u" initiative, focusing on holistic water harvesting and management. There are ongoing collaborations

with various partners like World Vision to improve sanitation facilities and promote water treatment at the household level.

Exposure and Vulnerabilities: The county's WASH infrastructure is vulnerable to climate change impacts, such as prolonged droughts and erratic rainfall patterns.

Limited awareness and governance issues have hindered the sustainable management of existing water resources.

Makueni County is making strides in addressing these challenges through partnerships, technology adoption, and policy frameworks. Analysis of climate risks based on hazards and exposure.

Analysis of climate risks based on hazards and exposure.

The County's climate risk profile highlights several key hazards and exposures;

Key Climate Hazards

i. **Drought:** The county experiences frequent and prolonged droughts, leading to severe water shortages and reduced agricultural productivity.
ii. **Erratic Rainfall:** Unpredictable rainfall patterns cause flash floods, soil erosion, and crop failures.
iii. **Rising Temperatures:** Increased temperatures accelerate evaporation rates, depleting water sources and stressing crops and livestock.
iv. **Land Degradation:** Soil erosion and deforestation reduce land fertility, affecting food security.
v. **Extreme Weather Events:** Heavy storms and strong winds damage infrastructure and disrupt livelihoods.

Exposure and Vulnerability

i. **Agriculture:** Over 80% of households rely on rain-fed farming making them highly vulnerable to drought and erratic rainfall.
ii. **Water Resources:** Boreholes and seasonal rivers are drying up reducing access to clean water. Water infrastructure is also vulnerable due to flashfloods
iii. **Livestock:** Pastoral communities face declining livestock productivity due to heat stress and water scarcity.
iv. **Human Health:** Rising temperatures increase cases of heat-related illnesses and vector-borne diseases like malaria.
v. **Infrastructure:** Roads and bridges suffer damage from flash floods, affecting transportation and economic activities.

Some of the adaptation strategies being implemented in the County include;

i. Implementation of Climate-smart agriculture to improve resilience.
ii. Emphasizing on water harvesting and conservation projects.

iii. Accelerating land afforestation and restoration initiatives.
iv. Implementing community-led adaptation programs to strengthen local responses.

2.2. Water Supply Services Coverage and Gaps

2.2.1. Status of water supply infrastructure (urban vs. rural)

Overview of water supply systems and service levels and water quality.

Urban Areas Water Access

Drinking water services refers to the accessibility, availability and quality of the main source used by households for drinking, cooking, personal hygiene and other domestic uses. Improved drinking water sources are those which, by nature of their design and construction, have the potential to deliver safe water and includes: piped water, boreholes or tube wells, protected dug wells, protected springs, rainwater, and packaged or delivered water. The JMP subdivides the population using improved sources into three groups according to the level of service provided. In order to meet the criteria for a safely managed drinking water service, households must use an improved source that is: Accessible on premises, Available when needed, and Free from contamination.

If the improved source does not meet any one of these criteria but a round trip to collect water takes 30 minutes or less, then it is classified as a basic drinking water service. If water collection from an improved source exceeds 30 minutes it is categorized as a limited service. The JMP also differentiates populations using unimproved sources such as unprotected wells or springs, and populations drinking surface water collected directly from a river, dam, lake, stream or irrigation canal.

The drinking water ladder is summarized as;

Service Level 1. Safely Managed service: Number of households collecting water from an improved water source/piped water which is located within their houses, available when needed, free from contamination.

Service Level 2. Basic service: Number of households collecting drinking water from an improved water source/piped and non-piped provided the collection time is not more than 30 minutes round trip.

Service Level 3. Limited service: Number of households collecting water from improved water source/piped and non-piped water but the collection time exceeds 30 minutes' roundtrip from the user dwelling.

Service Level 4. Unimproved service: Number of households collecting water from an unprotected well or spring at a high risk of contamination.

Service level 5 No service: Number of households with no access to a water source thus collecting water from open surfaces, rivers, ponds, irrigation canals etc

Based on the 2022 Makueni County Wards Statistical Profiles[2]4,675 (6%) of the urban households have access to an improved water source/piped water which is located within their houses, available when

needed, free from contamination. 26% of the urban households have service level 4 and 23,073 (30%) households have limited service. 13,204 urban households, 17% of the urban households have an unimproved service and 16,931 households have access to a water source thus are collecting water from open surfaces, rivers, ponds, irrigation canals as summarized in the table below

Table 28: Makueni County Urban Areas Water Service Levels

Sub-County	Ward	Service Class				
		Safely Managed (5)	Basic Service (4)	Limited Service (3)	Unimproved Service (2)	No service (1)
Kaiti	**Kilungu**	24	1,738	154	3,975	2,306
Kibwezi East	**Mtito Andei**	196	2,108	4,713	569	2,025
Kibwezi West	**Emali/ Mulala**	839	2506	3040	226	1,439
	Makindu	1,168	3,346	6,825	462	2,281
	Kikumbulyu South	1,044	1,870	2,769	712	1,891
Kilome	**Kasikeu**	665	2763	2232	2083	1694
Makueni	**Wote**	694	3803	2712	1004	3755
Mbooni	**Mbooni**	45	1902	628	4173	1540
Total		**4675**	**20036**	**23073**	**13204**	**16931**
		6%	**26%**	**30%**	**17%**	**22%**

Rural Areas Water Access (Water Service Level)

Based on WHO/UNICEF Joint Monitoring Program classification on drinking water sources in to service classes, 3,555 households from Makueni County areas classified as rural, collect water from a source/ piped water located within their houses and free from contamination. 49,350 (30%) of the rural households have a basic service, 28,038 (17%) have a limited service and 28,124 (17%) of the rural households have unimproved service and 58,069 (35%) collect water from open surfaces, rivers, ponds and irrigation canals. Table 29 summarizes the accessibility of households in rural areas to water and the various service levels.

Table 29: Makueni County rural areas water service levels

Sub-County	Ward	Service Class					
		5	4	3	2	1	Total
Kaiti	Ukia	171	1,835	581	2,925	5,093	10,605
	Kee	777	2,766	1,682	92	248	5,565
	Ilima	105	3,850	106	2,135	1,456	7,652
Kibwezi East	Ivingoni/ Nzambani	459	5,196	2,658	287	139	8,739
	Thange	238	3,076	4,313	331	304	8,262
	Masongaleni	54	4,678	3,990	506	1,931	11,159
Kibwezi West	Nguu/ Masumba	4	1,751	254	514	3,846	6,369
	Kikumbulyu North	18	374	2,282	376	1,989	5,039
	Nguumo	375	3,106	3,584	366	142	7,573
Kilome	Kiima Kiu/ Kalanzoni	248	4,257	2,507	1,416	1,076	9,504
	Mukaa	27	935	345	2,670	2,160	6,137
Makueni	Kitise/ Kithuki	14	1,707	606	446	2,479	5,252
	Mavindini	69	1,457	1,237	430	2,674	5,867
	Muvau/ Kikumini	14	2,636	325	960	2,285	6,220
	Kathonzweni	111	3,110	582	613	2,827	7,243
	Nzaui/ Kilili/ Kalamba	323	1,602	832	1,119	5,643	9,519
	Mbitini	119	2,050	316	1,680	2,700	6,865
Mbooni	Kalawa	45	1,032	259	581	5,111	7,028
	Kako/ Waia	19	679	153	653	4,961	6,465
	Kisau/ Kiteta	169	913	417	2,565	6,166	10,230
	Tulimani	56	1,197	790	3,392	3,291	8,726
	Kithungo/ Kitundu	140	1,143	219	4,067	1,548	7,117
Total		**3,555**	**49,350**	**28,038**	**28,124**	**58,069**	**167,136**
		2%	**30%**	**17%**	**17%**	**35%**	**100%**

Comparison between rural and urban households water service levels

More households in urban areas have access to water easily accessible and free from contamination as opposed to households in rural areas. This can be attributed to availability of limited infrastructure in the rural areas. Urban households are deemed to have a higher financial capability hence justifying installation and maintenance abilities than rural areas.

Households in rural areas have a higher access to water in open surfaces as compared to urban households. A summary of detailed comparison is shown in table 30 and figure 6.

Table 30: Comparison between households in urban and rural areas in Makueni County

Service Class		Number of Households		
		Rural	Urban	Total
5	Safely Managed	3,555	4675	8,230
4	Basic	49,350	20036	69,386
3	Limited	28,038	23073	51,111
2	Unimproved	28,124	13204	41,328
1	No service	58,069	16931	75,000
Total		**167,136**	**77,919**	**245,055**

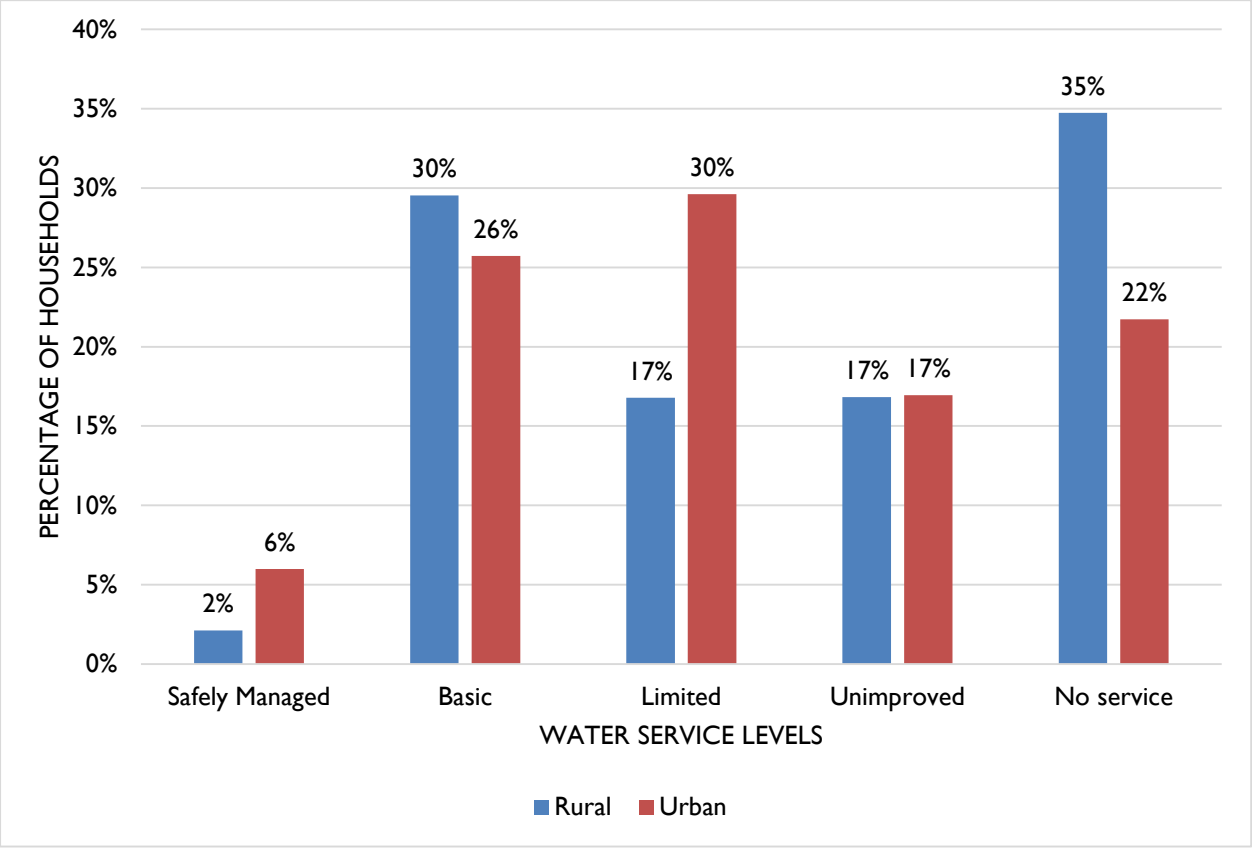


Figure 6:Summary in % For Water Service Levels For Rural And Urban Households In Makueni County

Social and Gender-Disaggregated Water Supply

Water supply issues in Makueni County have significant social and gender dimensions, particularly affecting vulnerable populations and women. Women often bear the brunt of water scarcity, as they are primarily responsible for fetching water for household use. This task can limit their opportunities for education, economic participation, and personal development.

Gender-disaggregated approaches to water management emphasize equitable access and participation. For instance, involving women in decision-making processes can lead to more inclusive and effective water resource management. Vulnerable populations, including those with disabilities, also face unique challenges in accessing water, highlighting the need for social inclusion principles.

In Makueni County, integrating gender equality and social inclusion into water supply policies could address disparities and empower communities. This involves ensuring equitable access to water resources, promoting women's leadership in water management, and addressing the specific needs of marginalized groups

2.2.2. Percentage of the population with access to improved water services

Coverage levels based on national and global standards.

Makueni County, faces significant challenges in providing adequate water resources to its residents. As of recent assessments, the county's basic water service level stands at 46%, limited 15%, unimproved 9.5% and surface water 29.5%. The national basic water service stands at 67.9%, limited 8.7%, unimproved 7.6% and surface water 15.8%. This disparity means that a substantial portion of the population relies on unimproved water sources, leading to concerns about water quality and accessibility.

While Makueni County has made significant strides in developing water infrastructure, challenges persist in meeting the growing demand for water. Continued investment in infrastructure, effective management and exploration of new water sources are essential to ensure sustainable and equitable access to water for all residents.

2.2.3. Service delivery challenges (e.g. non-revenue water, maintenance issues)

Operational inefficiencies and their impact on service provision.

Operational inefficiencies in Makueni County significantly affect the provision of Water, Sanitation, and Hygiene (WASH) services. Challenges such as meeting growing demand, addressing water scarcity, managing infrastructure, poor resource allocation, coping with climate change impacts and lack of integrated systems have led to issues like limited access to clean water, poor sanitation facilities, and environmental degradation. For instance, about 46% of the population in Makueni relies on unimproved sanitation facilities, and open defecation remains a concern. Additionally, the absence of piped sewerage systems and structured fecal sludge management exacerbates the situation1.

The economic impact is also notable, with the county losing approximately KES 638 million annually due to poor sanitation. Efforts like the Makueni Countywide Inclusive Sanitation Strategy aim to address these inefficiencies by adopting a multi-sectoral approach and improving sanitation financing

Potential solutions for reducing non-revenue water and improving reliability

Makueni County has been actively addressing the challenges of non-revenue water and improving water reliability through innovative strategies:

Reducing Non-Revenue Water

1. **Smart Metering**: The county has deployed smart meters at water points, enabling accurate tracking of water usage and reducing revenue leakages. These meters use prepaid token cards or mobile wallets for payment, ensuring accountability.
2. **Leakage Detection Technology and Repair**: Effective leak detection and repair are crucial for reducing physical losses in the water network. Investments in high-density polyethylene pipes minimizes leakages in the pipeline network system.
3. **Bulk Water Meters**: These meters help monitor large-scale water distribution, ensuring efficient management.
4. **Partnerships**: Collaborations with organizations like USAID-STAWI have provided funding for expanding smart metering programs. Also, partnership with KEWI (Kenya Water Institute), and other organizations like DOSHI (Doshi Technologies) is crucial for NRW reduction.

5. **Water Network Segmentation (Establishment of District Metered Areas-DMAs):** Dividing the water network into sections allows for more efficient assessment and repair of leaks. This makes it easy to track water production versus revenue collection hence minimizing NRW.
6. **Monitoring and Evaluation:** Continuous monitoring of network activities and water consumption patterns is essential for tracking NRW reduction efforts.
7. **Government Policy:** The GoK has set NRW reduction as a national priority.
8. **Capacity Building:** JICA, through projects like the "Project for Strengthening Capacity in NRW Management," focuses on strengthening WSPs' skills and capacity in NRW reduction.
9. **Technical Standards:** WASREB (Water Services Regulatory Board) provides standards and guidelines for NRW management, including manuals and handbooks

Improving Water Reliability

1. **Borehole Projects**: The county has drilled additional boreholes in areas like Kalawa Ward to boost water supply. These boreholes have a capacity of 20 cubic meters per hour, significantly improving access.
2. **Water Management Information System (MIS)**: A transformative digital system tracks water infrastructure, functionality, and management challenges, enabling informed decision-making.
3. **Last Mile Water Connectivity Program**: Solar-powered water projects, such as the Lung'u Primary School borehole, supply clean water to households and institutions.
4. **Community Engagement**: Local water companies like KIBMAWASCO, WOWASCO & MBONWASCO oversee operations to prevent vandalism and ensure proper maintenance.
5. **Dams and Groundwater Recharge:** County Government of Makueni Kenya is improving water reliability by investing in large and medium dams to store water during the rainy season and implementing managed aquifer recharge to replenish groundwater resources. E.g. UYI Dam in Masongaleni Ward
6. **Rainwater Harvesting:** The county government is enacting policies encouraging the use of subsidized water storage tanks through initiatives to help communities store rainwater for use during drier periods.

These initiatives not only address water scarcity but also foster sustainable development and better health outcomes for residents

Existing water service providers and their operational efficiency

The County, water service providers are actively working to improve access and operational efficiency. The main water service providers include; WOWASCO, KIBMAWASCO, and MBONWASCO. These companies are responsible for water supply and management within their areas of jurisdiction across the county.

The significant issues on operational efficiency include:

Non-Revenue Water, which accounts for 30% of the total water produced. This refers to water that is lost before reaching consumers due to leaks, theft, or metering inaccuracies.

Aging infrastructure, mostly service water providers depend on the system which make it inadequate to meet the current demand

High cost of production, Makueni being located at the arid and semi-arid areas most of the sources require pumping for water to reach designated areas and community at large hence the high cost of production unlike the counties with permanent rivers which allow water to flow by gravity

Resource Constraints: Limited financial resources hinder the rapid implementation of infrastructure and technological improvements.

Water Resource Management; Scarcity due to Droughts, over-extraction and climate change reduce water availability. Pollution: Industrial, agricultural, or domestic waste contaminates sources. Competition: Between agriculture, industry, and domestic users, leading to conflicts.

Governance and Institutional Issues Fragmented Management: Multiple agencies with overlapping roles can cause inefficiency. Corruption and Mismanagement: Can divert resources or reduce service quality. Lack of Planning: Poor urban planning leads to mismatched supply and demand.

Efficiency Measures:

The county has introduced smart meters to reduce water losses and improve revenue collection. These meters ensure that water usage is accurately tracked and paid for.
Investments in technology, such as high-density polyethylene pipes and leakage detectors, are being made to address infrastructure challenges.
Automation of water draw-off points is underway to minimize commercial water supply losses.

Governance Reforms: The county government is enacting policies to criminalize infrastructure vandalism and improve water governance. This includes capacity building for water service providers and committees.

Funding and Partnerships: Initiatives like the USAID-funded STAWI project have been supporting these efforts by providing financial resources for smart meter installations and other improvements.

Challenges in engaging with public and private water service providers

Public-private partnerships (PPPs) are often explored as a solution to address water service provision challenges, offering opportunities for innovation, investment, and improved efficiency. Engaging with public and private water service providers can be complex due to several aspects:

1. **Governance Issues**: Weak governance and lack of accountability hinders effective collaboration. Most of the private water service providers lack service level agreements with the formal WSPs.
2. **Infrastructure Limitations**: Aging or inadequate infrastructure often poses barriers to efficient service delivery for the public WSPs.
3. **Financial Constraints**: Insufficient funding for operations and maintenance limits the ability to meet service demands. One of the major limitation in finances is the use of non-cost recovery tariffs by the WSPs in which tariff decisions are often politically driven.

4. **Stakeholder Coordination**: Aligning the interests of various stakeholders, including governments, service providers, and communities, can be difficult.
5. **Performance Variability**: The performance of utility companies varies greatly, which can affect reliability and trust.
6. **Policy and Regulation**: Navigating complex policies and regulations can slow down progress.

Areas for strengthening service delivery models.

The areas of strengthening service delivery models within Makueni County include:

1) Strengthening of Community Ownership and Management through;
   a) **Empowering existing WUAs;** through advanced training on financial management, technical skills (beyond basic maintenance), conflict resolution, and governance; facilitating networking and learning exchanges between successful WUAs within and outside the county.
   b) **Formalizing Community Partnerships:** Development of clear frameworks and agreements outlining the roles and responsibilities of the county government and community-managed systems, ensuring mutual accountability and support.
   c) **Incentivizing Community Participation:** Explore mechanisms to incentivize active community participation in the management and protection of water resources and infrastructure, such as recognition programs or small grants for community-led initiatives.

2) Professionalizing management of rural water services provision: strengthening local vocational training centers in Makueni to build a pool of skilled technicians in water system operation, maintenance (including sand dams and boreholes), plumbing, and sanitation technologies relevant to the county.

3) Harnessing Technology for Efficiency and Monitoring in Makueni: Utilization of digital platforms for reporting water issues (e.g., leaks, breakdowns) and monitoring water availability at the community level. Consideration for SMS-based systems for wider accessibility. Development of a comprehensive GIS database of all water sources, infrastructure, and service coverage in Makueni to aid in planning, monitoring, and targeted interventions.

4) Strengthening County-Level Coordination and Regulatory Capacity: Establishment of a dedicated unit within the Makueni County government to coordinate all WASH-related activities, ensuring alignment between different departments and stakeholders.

5) Enhancing Climate Resilience in Makueni's WASH Sector: Investing in Climate-Resilient Infrastructure; and Water Conservation Management Programs.

6) Addressing Equity and Inclusion in Service Delivery: through targeted Programs for Underserved Areas; Gender-Sensitive Approaches; and Inclusivity for Vulnerable Groups.

The impact of climate change vulnerability and associated hazards (droughts, floods, and temperature) on water supply reliability

Climate change has significantly impacted water supply reliability in Makueni County, Kenya, due to its vulnerability to hazards like droughts, floods, and temperature fluctuations. Here's a summary of the situation:

1. Droughts: Makueni County, being largely arid and semi-arid, faces frequent and severe droughts. These droughts lead to the drying up of rivers and water sources, reducing water availability for both domestic and agricultural use. The wards majorly affected are, Masongaleni, Mtito Andei, Kitise/Kithuki, Mavindini, Kalawa.
2. Floods: While droughts dominate, occasional floods also disrupt water systems. Flooding can damage infrastructure, contaminate water sources, and hinder access to clean water. The wards affected are Mbitini, Mbooni, Kithungo/Kitundu, Kasikeu and Ilima wards
3. Temperature Changes: Rising temperatures exacerbate water scarcity by increasing evaporation rates and reducing the recharge of groundwater sources.

Efforts like the "Green Roads for Water" initiative have been introduced to improve water harvesting and storage, but challenges such as inadequate distribution systems and low community awareness persist.

2.3. Sanitation Services Coverage and Service Gaps

2.3.1 Status of household sanitation access (sewered vs. non-sewered options)

Article 43(b) of the constitution declares sanitation as a basic human right and guarantees the right of every person to reasonable standards of sanitation. Article 42 also guarantees the right to a clean and healthy environment. The Kenyan constitution therefore confers with the State on the obligation to give priority to ensuring the widest possible enjoyment of these rights. Makueni County has a total population of 987,653 persons, this is according to the 2019 population census. The current population is 1,065,482 people. This is expected to increase in the next five years. The county has 6 sub counties,30 wards,60 sub wards and 3,643 villages. Additionally, the county has a total of 281,709 households *(KHIS 2025).* Consequently 1,540 (42.2%) villages are triggered,106 villages are on follow-up, 1,434 (39.3%) villages, verified and certified open defecation free(ODF). *(Makueni WASH database 2025).* The rate of open defecation status coverage by the year 2022 was 4%. This decreased to 2% in 2023 and 1.6% in 2024. Consequently, the number of unimproved sanitation coverage by 2022 was 14%,10% in 2023 and 8% in 2024. The county has a total of 2209 un-triggered villages accounting to 60.7% of the total villages in the County.

The number of households with limited sanitation was 50% in 2022, 63% in 2023 and 63% in 2024.Those with basic sanitation were 10% in 2022, 20% in the year 2023 and 24% in 2024 which means that 86% in 2022 had access to improved sanitation, 90% in 2023, and 92% in 2024.

The number of households with safely managed sanitation service for both rural and urban areas is extremely low. This can be attributed to limited economic capability and high costs of building safely managed systems. Urban areas have slightly better access (0.71%) in comparison to rural areas (0.12%) due to proximity to services but still limited in coverage.

For basic sanitation service, urban areas (23.94%) outperform rural areas (19.72%) which can be associated with easier access to resources for constructing the facilities. In addition, poverty and lack of

awareness to construct safely managed services is more rampant in rural areas as compared to urban areas.

Most households in Makueni County fall under the category of limited sanitation service. Shared facilities provide better hygiene than unimproved sanitation but remain more accessible than private toilets. A summary of sanitation service level comparison between urban and rural households' sanitation access is shown in table 31 below:

Table 31:Rural vs urban areas sanitation service levels in Makueni County

Service Class		Rural	Urban	Total
5	**Safely Managed**	293	564	857
4	**Basic**	48,781	18,891	67,672
3	**Limited**	162,155	49,333	211,488
2	**Unimproved**	33,326	8,960	42,286
1	**Open Defecation**	2,809	1,167	3,976
Total		**247,364**	**78,915**	**326,279**

Makueni county has various informal settlements namely Kima, Masumba Mbindu, Kawese in Kilome sub County, Kalembe Raha, Mikululo and Kikunduku in Kibwezi West sub county and Subati in Kibwezi East. The status of sanitation services in these permanent and temporary informal settlements has not been met as per the expected standards. Various climate change impacts such as mudslides, collapsing of sanitary facilities and dwelling houses have also affected WASH services specifically in Mbooni and Kaiti sub counties during rainfall seasons. This calls for hygiene and sanitation promotion in emergencies.

Some of these informal settlements were due to displacements from Chyulu hills due to human encroachment of the game park.

Social and gender disaggregated access to sanitation (impact on vulnerable and women)

In Makueni County, access to sanitation remains a critical public health and social equity issue with significant disparities based on gender and social vulnerability. While national and county-level efforts have made progress in expanding basic sanitation services, women, children, persons with disabilities, elderly and other marginalized groups continue to face challenges in accessing safe, adequate and dignified sanitation facilities.

Gender-disaggregated data indicates that women and girls are disproportionately affected by poor sanitation within the county. Inadequate access to gender-responsive sanitation infrastructure exposes them to health risks, limits their privacy and safety and often leads to social stigma especially during menstruation, pregnancy and caregiving responsibilities.

Vulnerable populations, including the elderly, people with disabilities and ultra-poor households frequently encounter additional barriers due to the location, design or affordability of available sanitation facilities. For instance, poorly maintained or distant latrines compromise privacy and safety, discouraging use and sometimes leading to open defecation. The absence of inclusive and disability-friendly sanitation services exacerbates social exclusion and limits these groups' participation in education, economic

activities and public life. Furthermore, the burden of managing household sanitation and water-related duties disproportionately falls on women and girls thus affecting their time, health and opportunities for advancement.

It is therefore evident that access to water and sanitation services in Makueni County exhibits notable disparities that have significant implications, particularly for women, elderly, children and PWDs. According to the 2022 Kenya Demographic and Health Survey (KDHS) Fact Sheet for Makueni County, only 46% of the household population has access to at least basic drinking water services. This figure is lower than the national average of 68%. Similarly, 46% of households in Makueni have access to at least basic sanitation services, which is slightly higher than the national average of 41%.

It is noteworthy that the limited access to water and sanitation services disproportionately affects women and girls, who are traditionally responsible for water collection and maintaining household hygiene. This responsibility often exposes them to various risks, including gender-based violence (GBV).

In addition, the County is prone to flooding affecting the access to sanitary facilities to an extent of evacuating the displaced households making women, children, aged and people with disability vulnerable to extreme conditions.

The County has recognized the need to adopt a multi-sectoral approach that incorporates gender-sensitive planning, community engagement and investment in accessible, safe and affordable sanitation infrastructure tailored to the diverse needs of its population.

2.3.2 Coverage of public and shared sanitation facilities, including market centers and informal settlements

Availability and adequacy of public sanitation services.

The use of sanitation technologies across Makueni County is illustrated in the attached table, which indicates that 45.7% of the population has access to basic sanitation services. Additionally, 98.4% of the county utilizes onsite sanitation, while 1.5% of the population, approximately 3,217 households, practice open defecation. (Kenya National Bureau of Statistics, 2022). Furthermore, Makueni County has limited access to water, with only 46% of the population having access to at least basic services.

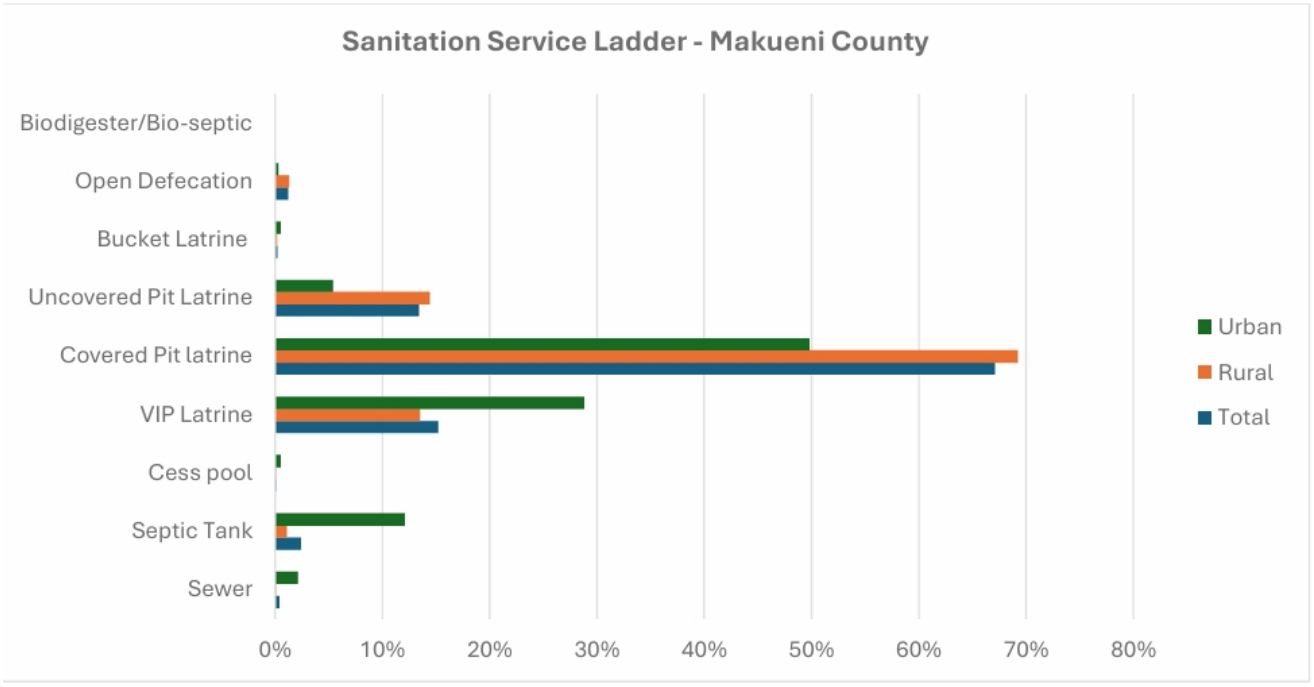


Figure 7: Makueni County - Market sizing for decentralized services 2025

Solid waste in the County is primarily burnt in the open (28.6%), and in pits (23.9%). A substantial amount (24.8%) is put in a compost pit and dumped in the compound (13%). A small portion is also collected (4.4%). This includes 4% by county government, 0.1% by CBOs and 0.3% by private companies. 5% of the population throw non-combustible solid waste in their latrine. The County is the leading provider of solid waste collection services in both rural and urban areas. 12.3% of the population have access to basic hand washing facilities; 9.8% have access to limited handwashing facilities, and 77.9% have no handwashing facility which is alarmingly high as per the Kenya National Bureau of Statistics, 2022.

Inadequate gender-sensitive and inclusive sanitation facilities disproportionately impact women, girls and persons with disabilities especially during menstruation. It is evident that with limited access to private, safe and hygienic sanitation, many girls are forced to miss school or drop out entirely. Furthermore, most public toilets do not adequately cater to the unique needs of women and girls such as menstrual hygiene management (MHM), privacy and safety. Sanitation facilities rarely consider universal design principles. For instance, persons with disabilities (PWDs) often face physical barriers such as narrow doorways, lack of ramps and high toilet seats. Moreover, there is limited awareness and capacity among local artisans and public works departments to design and construct inclusive sanitation infrastructure.

The County remains committed to addressing gender-specific water and sanitation needs by adopting inclusive approaches that prioritize the provision of accessible water sources, construction of gender-segregated and menstrual hygiene-friendly sanitation facilities and active participation of women, girls and other special interest hygiene groups in decision-making processes.

Infrastructure gaps and investment needs.

The sanitation infrastructure gaps in Makueni county significantly impact public health and environmental sustainability. Addressing these gaps is crucial for improving hygiene practices, reducing disease transmission, and enhancing the overall quality of life for residents. Below is a detailed overview of the key sanitation infrastructure challenges faced by the county.

1. Lack of sewerage treatment Facilities in Urban Centres

Challenges: The absence of adequate sewerage treatment facilities in urban areas leads to untreated sewage being discharged into the environment. This situation poses serious health risks, contributes to the spread of waterborne diseases, and contaminates local water sources.

2. Limited Solid Waste Collection Service

Inadequate solid waste collection services have resulted in illegal dumping and accumulation of waste in public spaces. This creates unsightly environments, attracts pests, and poses health hazards to the community, increasing the risk of disease transmission.

3. Insufficient Clean Water Supply Systems

Limited access to clean water supply systems negatively impacts sanitation practices, as residents may resort to unsafe water sources for drinking and hygiene. Insufficient water supply exacerbates sanitation issues and increases the risk of disease transmission, particularly in vulnerable populations.

4. Inadequate Public Toilets

There is a lack of enough public toilets in markets within Makueni county. Some of the existing public toilets are not user friendly for marginalized populations including; disabled, elderly, and young children. This inadequacy affects hygiene practices and can lead to increased open defecation, further compromising public health.

5. Low Quality of Pit Latrines in Households

Many households rely on poorly constructed pit latrines that do not meet health standards, especially privacy leading to open defecation which in turn poses health risks and environmental contamination Low-quality latrines can collapse or become unsanitary, contributing to the spread of diseases and environmental degradation.

6. Practicing of Open Defecation

Open defecation remains prevalent in some areas due to a lack of access to safe sanitation facilities and cultural norms. This practice poses significant public health risks, including the spread of waterborne diseases and environmental pollution. Makueni County has a population of 130,375 who practice open defecation accounting to 1.2% of the total population.

7. High Cost of Constructing Improved Pit Latrines/Septic Tanks

The financial burden of constructing improved sanitation facilities (Choo bora) can be prohibitive for low-income households. High costs deter families from investing in better sanitation solutions, perpetuating reliance on inadequate facilities (bora Choo).

8. Low Quality of Sanitation Facilities in Institutions

Many institutions, particularly primary schools, lack adequate sanitation facilities, leading to poor hygiene practices among students. Insufficient facilities can discourage school attendance, particularly for girls during menstruation, affecting educational outcomes.

9. Sinking (submerging) and Collapsing of Pit Latrines

Poor construction and inadequate site selection due to lack of consultations from technical personnel can lead to the sinking and collapsing of pit latrines, posing safety hazards. Collapsed latrines can contaminate the surrounding environment and water sources, further exacerbating public health issues.

10. Absence of Formalized Waste Management Services for Feacal Sludge

The lack of formalized systems for the treatment and emptying of fecal sludge from pit latrines in both rural and urban areas leads to unsafe disposal practices. The inadequate formalized waste management services for fecal sludge, including treatment, storage, and emptying (DTF), is a significant challenge in both rural and urban areas of Makueni County. The County currently has one functional public DTF. This gap has far-reaching implications for public health, environmental sustainability, and overall community well-being

Investment Needs for Improving Sanitation

To address the significant sanitation infrastructure gaps in Makueni County, targeted investments are essential. These investments should focus on developing sustainable solutions for fecal sludge management, improving sanitation facilities, and enhancing public health outcomes.

1) Infrastructure Development

Construction of Treatment Facilities: Establish dedicated fecal sludge treatment plants in both urban and rural areas to ensure safe processing and disposal of waste. Develop decentralized treatment systems that can serve remote communities effectively.

Construction of Public Toilet Facilities: Invest in the construction of accessible public toilets, particularly in urban centers, to cater to the needs of everyone including marginalized populations (disabled, elderly, and young children). Ensure that public toilets are well-maintained, hygienic, and equipped with necessary amenities.

Sewerage Systems: Develop sewerage treatment facilities in urban centers to manage wastewater effectively and reduce environmental contamination. Consider upgrading existing sewer systems (Makueni County Referral hospital lagoons) to accommodate growing populations and prevent overflow during heavy rains.

2) Capacity Building and Training

Training Programs: Implement training programs for local service providers and community members on safe fecal sludge management practices, including emptying, treatment, and disposal. Provide education on the construction and maintenance of improved sanitation facilities, such as pit latrines and septic tanks.

Technical Assistance: Engage experts to provide technical assistance in designing and implementing effective waste management systems. Develop guidelines and standards for fecal sludge management to ensure safety and efficiency.

3) Community Engagement and Education

Awareness Campaigns: Fund community awareness campaigns to educate residents about the importance of proper sanitation practices and the health risks associated with poor waste management. Promote hygiene education in schools to instill good practices among children and encourage community involvement.
Participatory Planning: Involve community members in the planning and implementation of sanitation projects to ensure that solutions are culturally appropriate and meet local needs. Utilize feedback mechanisms (public participation) to gather input from residents on sanitation services and facility needs in the community.

4) Public-Private Partnerships

Collaboration with Private Sector: Encourage partnerships between government agencies, NGOs, and private sector stakeholders to leverage resources and expertise in sanitation management. Explore innovative financing mechanisms, to fund sanitation infrastructure projects.
Service Delivery Models: Develop models for private sector involvement in the collection, treatment, and disposal of fecal sludge, ensuring that services are affordable and accessible to all community members and also to curb illegal dumping of fecal waste.

5) Monitoring and Evaluation

Data Collection and Analysis: Invest in systems for monitoring and evaluating sanitation services and infrastructure to assess their effectiveness and identify areas for improvement. Use data to inform policy decisions and allocate resources effectively.
Health Impact Assessments: Conduct health impact assessments to evaluate the effects of sanitation interventions on public health outcomes and adjust strategies accordingly.

6) Operation and maintenance modalities.

Effective operation and maintenance modalities for sanitation infrastructure are essential for ensuring public health, environmental protection, and overall reliability for sanitation services across the county. To enhance the sustainability and effectiveness of sanitation infrastructures and services, the county is ensuring the following; improving sanitation and waste management by ensuring consistent garbage collection and safe disposal services in urban centres, regular training for artisans on current sanitation technologies and requirements in order for the facilities to be friendly to all populations, increasing access to clean water by investing in water infrastructure and management (developing new water infrastructures for water harvesting and distribution), enhancing water governance and conservation of water catchment areas, improving service delivery through mobilization of more resources to invest in water development, educating the community about proper sanitation practices through implementation

of rural and urban sanitation and hygiene programs and engaging private companies in the management and maintenance of sanitation facilities in urban centres.

2.3.3 Sanitation challenges, including waste management, hygiene practices, and cultural barriers

Access to improved sanitation in Makueni County is low. Only about 33% of the county's population have access to improved sanitation, 46% use unimproved sanitation facilities while 19% use shared sanitation facilities. Open defecation is low at 1.6%. However, the pace of declaring villages open defecation free (ODF), is slowed by inadequate resource allocation to the community-led total sanitation (CLTS) process and especially the village verification and certification processes. Despite the rapidly growing urban population, Makueni County lacks adequate fecal and general solid waste management systems. Specifically, Makueni County does not have a single sewerage system or a designated landfill for waste disposal in any of the urban areas. Septic tanks and pit latrines are the available options. Feacal sludge management services are not regulated, resulting in poorly constructed septic tanks as well as illegal disposal of fecal sludge. Ineffective management of general solid and health care waste puts the county at a very high risk of water sources pollution as well as putting communities and health care Waste management workers at risk of health problems.

Key behavioral, cultural, and logistical constraints.

Despite high latrine coverage of 98.5%, part of the population, approximately 1.6% is still practicing open defecation. This is because only 39.3% of the total villages have undergone Community led total sanitation process which calls for social behavior change. The majority of the villages have sanitation on grade one (where we have *bora Choo*) due to low economical ability to provide *Choo bora* (standard sanitary facility). The low and unreliable rainfall impacts negatively on financial ability as the majority of the population depend on farming. This leads to shifting the community priorities from sanitation to search for daily meals.

Impacts of climate change (including flooding and rising water tables) on sanitation infrastructure.

Climate change in Makueni County has negatively impacted sanitation because 98.4% of sanitary facilities are classified as grade one. During heavy rains and floods, latrines often become submerged, and some develop major cracks, which can affect privacy and render them unsafe for use. Additionally, during floods sanitary facilities fecal matter is washed away to rivers and other water bodies causing an upsurge of fecal oral diseases. High water tables in some sub counties calls for construction of expensive sanitation technologies which impact negatively on low income community members hence opting for open defecation. To solve the impact of floods and high water table in various parts of Makueni County, sanitation technologies such as SAFI latrines are recommended even in the areas where we have loose falling soils. These areas with loose and falling soil in the county include Mbitini, Mutiswa, Muambwani, Kawese, Vombo, Kwale, Sultan Hamud, Salama and areas along Athi River corridor.

Potential strategies for improving sanitation uptake.

The county has embraced strategies such as strengthening Community Led Total Sanitation through embracing market sanitation, training of local artisans and advocacy for social behaviour change communication to community members to own sanitation especially on Post ODF for sustainability, continuous follow ups on the triggered villages to ensure sanitation uptake, implementation of sanitation policies and other policy documents (e.g. CIDP) and strengthen multisectoral collaboration on sanitation uptake. Through implementation of CLTS, the community has been actively engaged which has impacted positively in behavior change in the triggered villages, this is clearly evident in the open defecation free villages.

2.3.4 Assessment of fecal sludge and wastewater management and existing treatment Facilities

Status of sludge and wastewater containment, collection, treatment, and disposal.

Sludge and wastewater management in Makueni county involves a comprehensive process of containment, collection, treatment, and disposal. Containment prevents the spread of waste, while collection systems transport it to the treatment facilities. The employed treatment processes are thickening, dewatering, and digestion which reduces the volume and potential harm of sludge, leading to safe reuse or disposal through method of land application and landfill.

1) Containment: The purpose of containment is to prevent the spread of waste and reduce contamination, ensuring safe collection and treatment. The method of treatment mostly used in Makueni county is off-site Decentralized treatment facility (DTF). Proper containment ensures safe collection and subsequent treatment of fecal sludge and wastewater, protecting public health and the environment. Permanent containment technologies that are needed include in-ground ponds lined with materials like geo-membranes or concrete and lagoon systems, which can be used in conjunction with treatment processes (DTFs).
2) Collection: In Makueni county the most preferred method of transporting waste from the point of generation to a treatment facility is by vacuum sewers (Exhausters). It ensures an efficient collection system which is crucial for the overall wastewater management process, ensuring that wastewater reaches treatment facilities for processing.
3) Treatment: It reduces the volume of sludge and makes it safe for reuse or disposal. The method of treatment process is thickening (concentrating sludge), dewatering (reducing water content), and digestion (reducing organic matter and pathogens). It is an efficient treatment process which reduces the environmental impact of sludge, preparing it for safe reuse or disposal.
4) Disposal: The treated sludge is properly done to minimize environmental risks and potentially recovers resources. The disposal method used is land application (for nutrient-rich soil amendments) and landfilling.

The waste disposal is properly done and ensures that sludge is managed responsibly, preventing environmental contamination and potentially maximizing resource recovery

Climate risks affecting wastewater and fecal sludge management.

Climate change significantly impacts wastewater and fecal sludge management in multiple ways, posing both operational challenges and opportunities. Increased rainfall leads to larger inflows and power outages, while decreased rainfall results in stronger, potentially toxic influent. Sea level rise causes flooding and impacts wastewater treatment systems. Additionally, climate change affects the performance of treatment processes and increases odor emissions. However, climate change also presents opportunities for wastewater reuse, reducing water scarcity and nutrient demands on agriculture.

Specific Impacts:

1) **Increased Rainfall:** Higher rainfall leads to larger volumes of wastewater, potentially overwhelming treatment plant capacity and causing more untreated sewer overflows.
2) **Decreased Rainfall:** Droughts and reduced rainfall concentrate pollutants in wastewater, potentially exceeding toxicity limits and harming the treatment process.
3) **Sea Level Rise:** Rising sea levels flood wastewater and fecal sludge, interfere with outflow, and raise groundwater tables, impacting treatment processes and infrastructure.
4) **Temperature Extremes**: Increased temperatures affect the performance of biological treatment processes, potentially leading to decreased treatment efficiency and increased odor emissions.
5) **Climate Change and wastewater and fecal sludge management Operations:** Climate change also causes more extreme weather events, such as heat waves and droughts, which can lead to more untreated wastewater.

Opportunities:

1) **Wastewater Reuse:** Climate change-induced water scarcity highlights the need for wastewater reuse, both for irrigation and industrial purposes.
2) **Nutrient Recovery:** Wastewater contains valuable nutrients like nitrogen, phosphorus, and potassium, which can be recovered and used in agriculture, reducing the need for synthetic fertilizers.
3) **Carbon Footprint Reduction:** Wastewater and fecal sludge management can reduce their own carbon footprint by adopting technologies that minimize energy consumption and greenhouse gas emissions.
4) **Climate Change Resilience:** Investing in more resilient infrastructure and adapting treatment processes to changing climate conditions can help wastewater and fecal sludge management cope with the impacts of climate change.

In essence, climate change presents a complex challenge and opportunity for wastewater treatment. Wastewater and fecal sludge management need to adapt to changing conditions, embrace innovative technologies, and consider wastewater reuse as a crucial strategy for mitigating climate change impacts and ensuring water security.

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

Investing in climate-resilient sanitation services offers significant opportunities for both public health and environmental benefits, particularly in developing countries. This can involve both sewered and non-sewered systems, with a focus on technologies that are climate-smart, adaptable to local conditions, and can contribute to resource recovery. These systems can also help reduce greenhouse gas emissions from sanitation.

Opportunities for Investment:

1) **Climate-Smart Technologies:** Investment in technologies that minimize environmental impact, such as aerobic treatment, energy-efficient treatment approaches, and regular de-sludging of containment facilities.
2) **Resource Recovery:** Embrace circular sanitation solutions like biogas production and composting, which can reduce methane emissions and provide renewable energy or soil enhancers.
3) **Adaptation and Resilience:** Design systems that can withstand climate-related hazards like flooding and drought, including structural and operational adaptations.
4) **Community Engagement:** Involve local communities in the planning and implementation of sanitation projects to ensure they are relevant and sustainable.
5) **Financial Mechanisms:** Explore innovative financing mechanisms, such as grants, loans, or public-private partnerships, to make climate-resilient sanitation services more accessible.
6) **International Collaboration:** Partner with international organizations and development agencies to access expertise, funding, and technical assistance.
7) **Policy and Regulatory Frameworks:** Support the development of national and local policies that prioritize sanitation, encourage innovation, and provide incentives for climate-resilient practices.

2.4. Access to WASH for Schools and Healthcare Facilities

2.4.1 Status of water supply and sanitation in schools and health care facilities

A higher proportion of the budget allocated to the department in charge of water and sanitation is mainly used for the delivery of water services while the remaining is used for solid waste management including market cleaning and public toilets construction and maintenance. The County sanitation sector depends mainly on financing from Non- Governmental Organizations and development partners to sanitation interventions.

Only 3,976 (1.2%) households in Makueni County practice open defecation. SGD 6.2 aims to achieve adequate and equitable sanitation access by 2030 and elimination of open defecation with close attention to girls, women and the vulnerable. To achieve SGD 6.2, the County should have embraced Community Led Total Sanitation (CLTS) and increase funding for sanitation programs.

Existing WASH infrastructure and service levels.

Educational Facilities Water Access

Access to water is critical for promoting health and hygiene in schools. According to the K-WASH World Bank Survey conducted in 987 public primary and ECDs over the month of December 2024, 698 (71%) schools in Makueni County have access to water throughout the year, 216 schools (22%) have access to water with irregular supply, while 73 schools (7%) do not have access to water all year round. The schools water access is further clustered into Joint Monitoring Programme ladder service levels. The criteria for clustering is defined below.

1. **Safely Managed Service (5)** - Piped water supply directly available at the premises and in good quality.
2. **Basic Service (4) -** Piped water supply on site or up to 500m but not readily available or does not meet the WHO Standards, rainwater directly on the premises or up to 500m away, protected well/spring, packaged water bottle
3. **Limited Service (3)-** Number of schools collecting water from piped water supply or rain water more than 500m away from the premises, water supply from tankers and carts.
4. **Unimproved Service (2) –** Number of schools collecting water from unprotected well/ spring
5. **No service (1) –** Number of schools collecting water from an open surface

Table 32:Water Service Levels access for Schools in Makueni County

Sub County/ Ward	No Service (1)	Unimproved Source (2)	Limited Service (3)	Basic Service (4)	Safely Managed Service (5)	Sub Total
Kaiti	20	2	17	88		127
Ilima	1	2	3	22		28
Kee	3			23		26
Kilungu	1		1	26		28
Ukia	15		13	17		45
Kibwezi East	16	1	25	88	1	131
Ivingoni/Nzambani	1		10	24		35
Masongaleni	3		4	27	1	35
Mtito Andei	7		8	19		34
Thange	5	1	3	18		27
Kibwezi West	11	1	46	106	3	167
Emali/Mulala	2		5	18	1	26
Kikumbulyu North	1		9	12		22
Kikumbulyu South			6	8		14
Makindu	2		17	21		40
Nguu/Masumba	4	1	5	26	1	37
Nguumo	2		4	21	1	28
Kilome	20		11	73	3	107

Sub County/ Ward	No Service (1)	Unimproved Source (2)	Limited Service (3)	Basic Service (4)	Safely Managed Service (5)	Sub Total
Kasikeu	14		6	30	2	52
Kima Kiu/Kalanzoni	4		4	21		29
Mukaa	1		1	22	1	25
(Blank)	1					1
Makueni	39		31	161	5	236
Kathonzweni	1		4	38		43
Kitise/Kithuki	6		6	20	1	33
Mavindini	2		2	22	1	27
Mbitini			1	31	2	34
Muvau/Kikumini	8		3	19		30
Nzaui/Kilili/Kalamba	18		5	24	1	48
Wote	4		10	7		21
Mbooni	8	3	10	196	3	220
Kalawa			7	33		40
Kiteta-Kisau	2			41	1	44
Kithungo/Kitundu	1	3		32		36
Mbooni	1		2	29		32
Tulimani	3		1	31		35
Waia-Kako	1			30	2	33
Sub Total	**114**	**7**	**140**	**712**	**15**	**988**

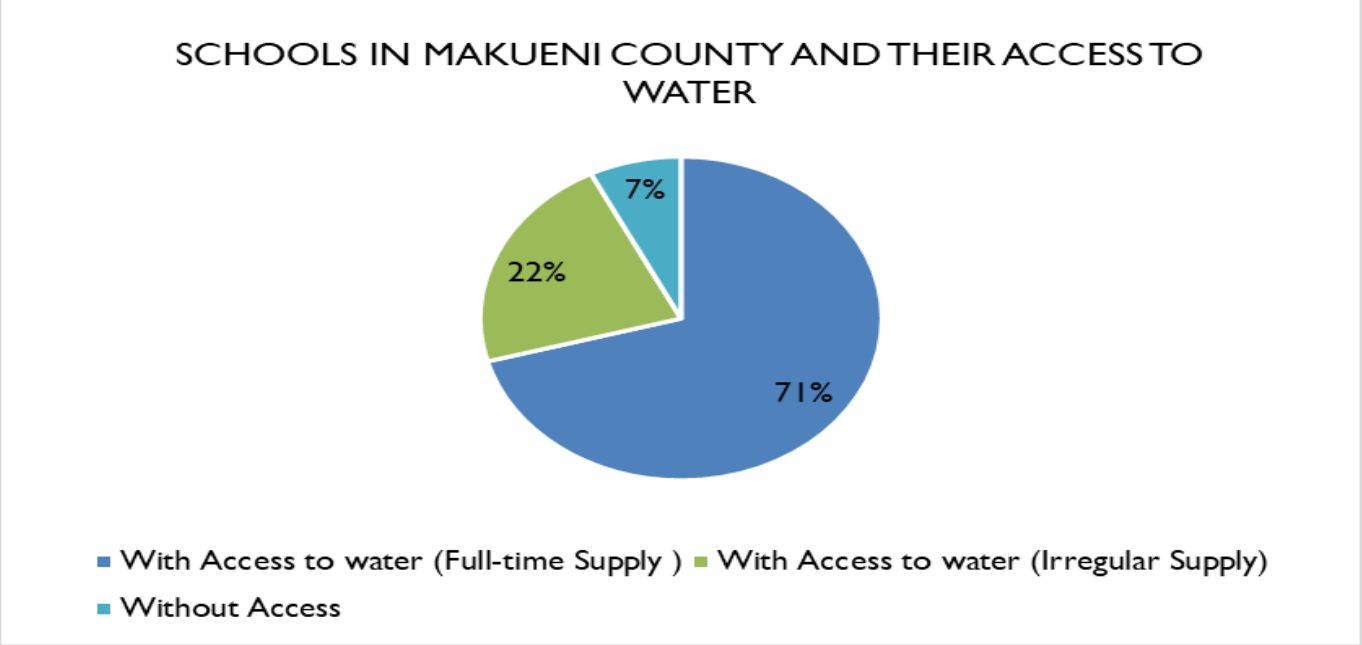
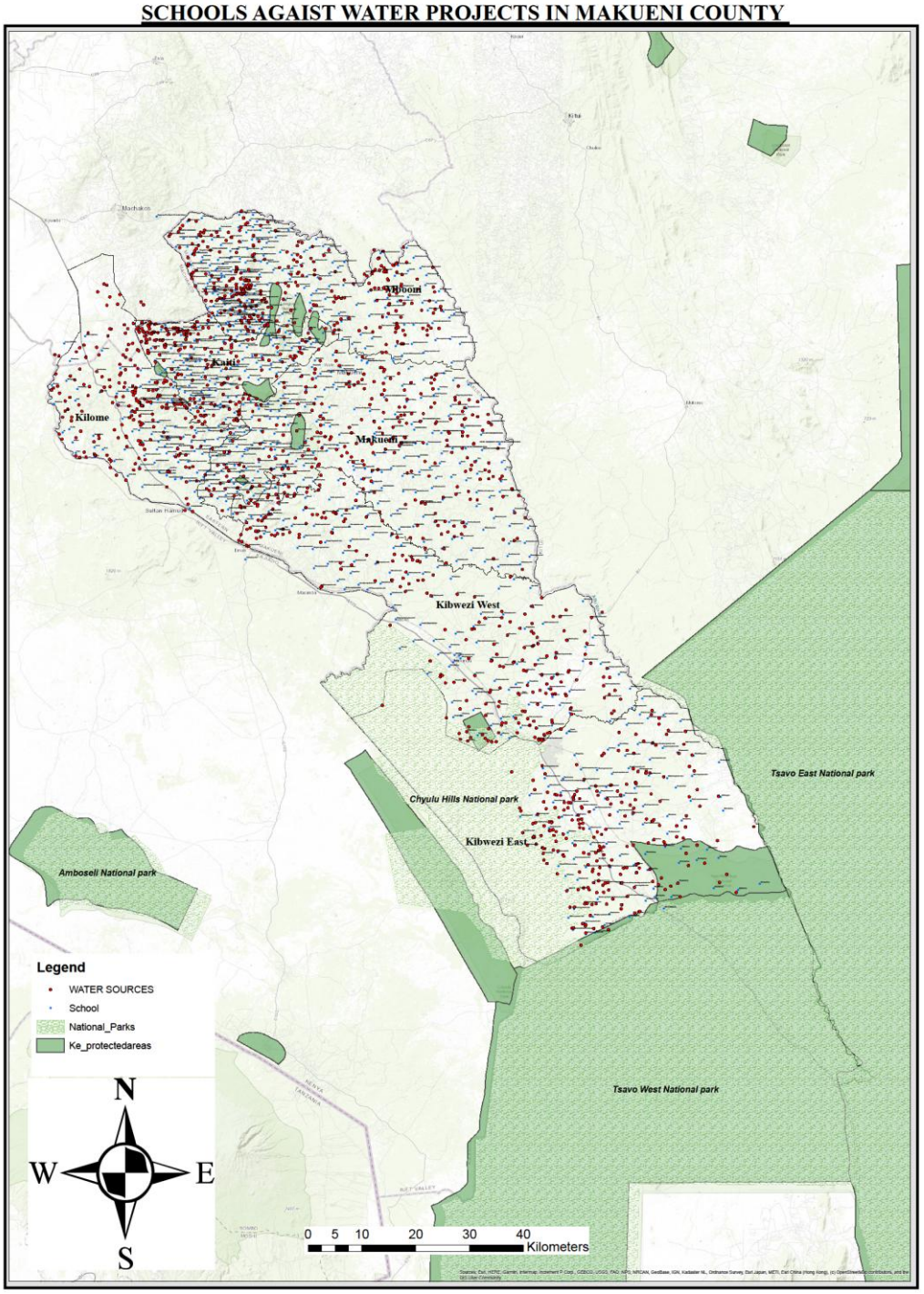


Figure 8:Schools in Makueni and their access to water

Table 33:Number of schools with and without access to water

Sub-County	Number of Schools			
	With Access to water (Full-time Supply)	With Access to water (Irregular Supply)	Without Access	Total
Kaiti	78	38	12	128
Kibwezi East	84	37	8	129
Kibwezi West	123	36	8	167
Kilome	59	36	12	107
Makueni	157	52	27	236
Mbooni	197	17	6	220



Map 11:Health Care Facilities Water Access

The World Bank Survey, which was carried out in December 2024, found that out of 226 healthcare facilities, 110 (49%) in Makueni County have year-round access to water, while 116 (51%) do not. Figure/table below summarizes Makueni County's water access for healthcare institutions.

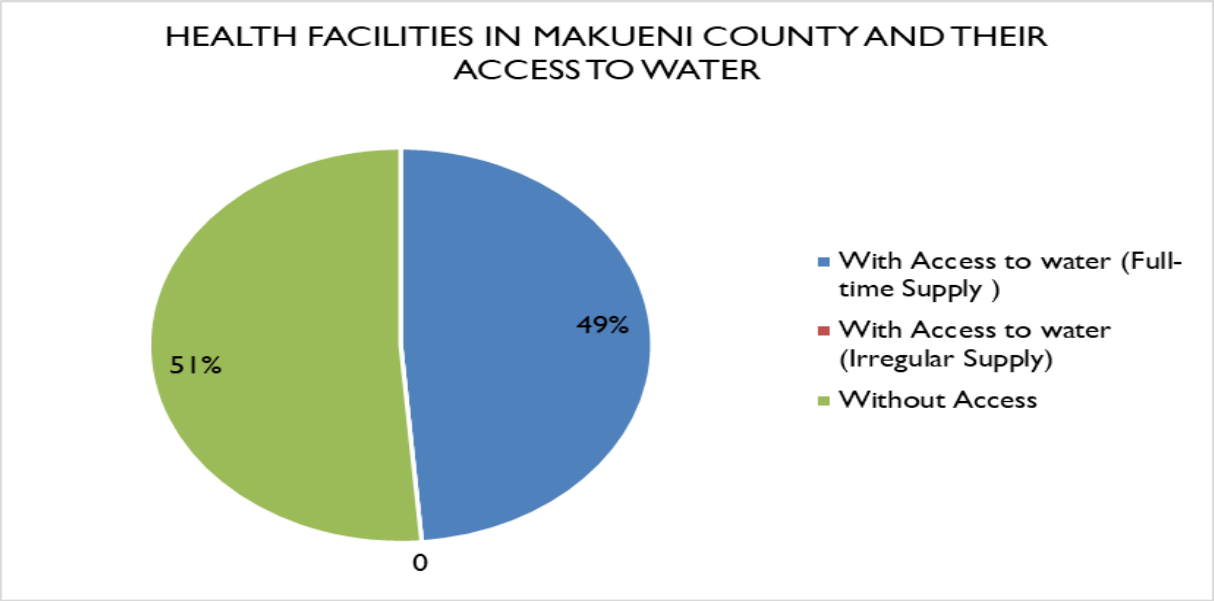
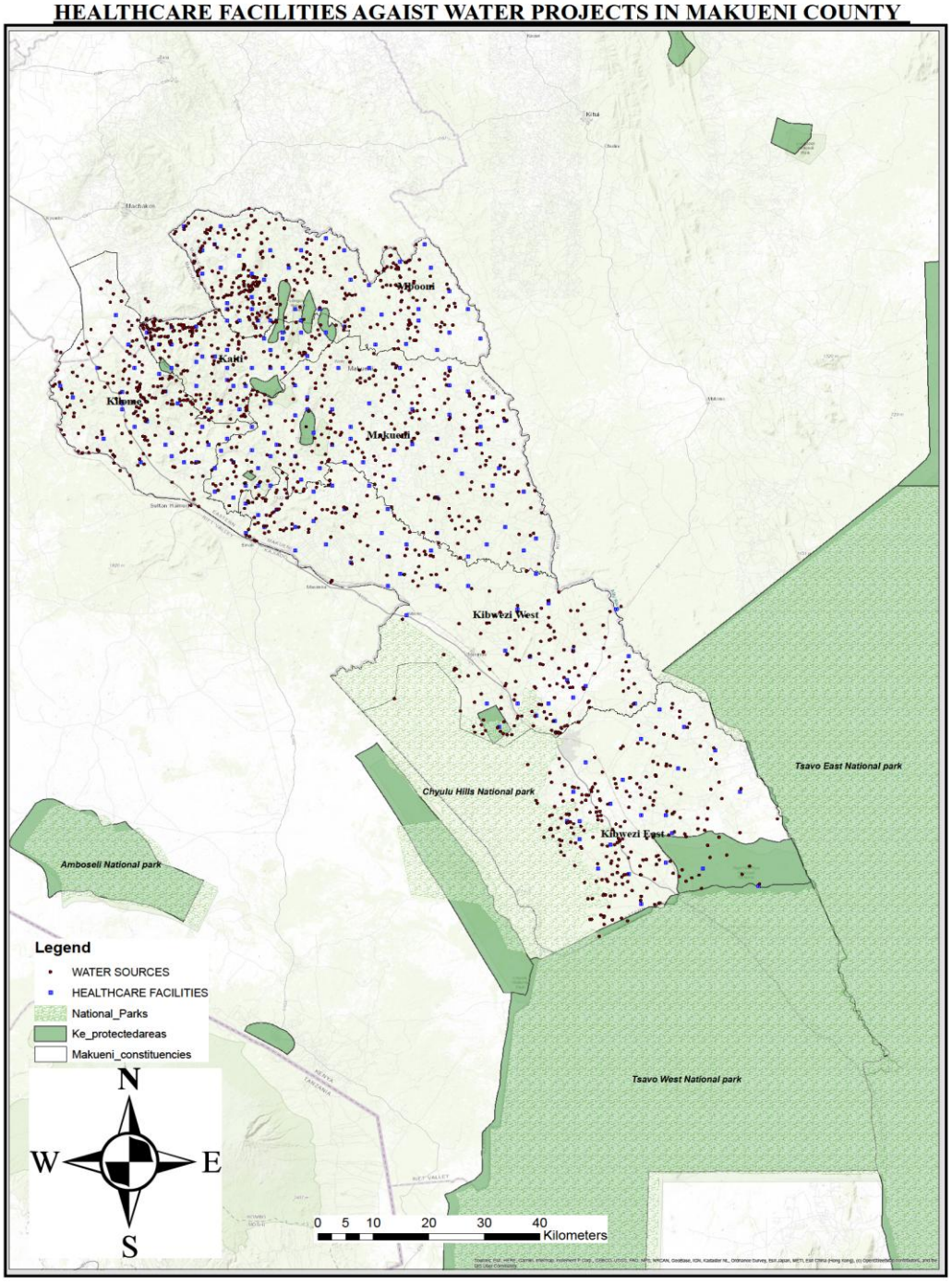


Figure 9:Makueni County's water access for healthcare institutions

Table 34:Makueni County's water access for healthcare institutions

Sub-County	Number of Health Facilities			
	With Access to water (Full-time Supply)	With Access to water (Irregular Supply)	Without Access	Total
Kaiti	19	0	13	32
Kibwezi East	7	0	16	23
Kibwezi West	18	0	24	42
Kilome	13	0	14	27
Makueni	33	0	27	60
Mbooni	20	0	22	42



Map 12:Disparities in access across different institutions.

Educational Facilities Sanitation Access

The educational facilities considered are ECDE Centres, Primary schools, junior secondary schools and special unit schools. Makueni County has a total of 987 schools. All schools in Makueni County have access to a toilet facility. However, only 84% of the educational facilities have toilets that are safe for use. Anal cleansing is practiced in 653 (67%) schools in Makueni County. 636 (64%) of schools have an

operational hand washing facility while only 77 (8%) of schools have functional Menstrual Hygiene Management (MHM) facilities.

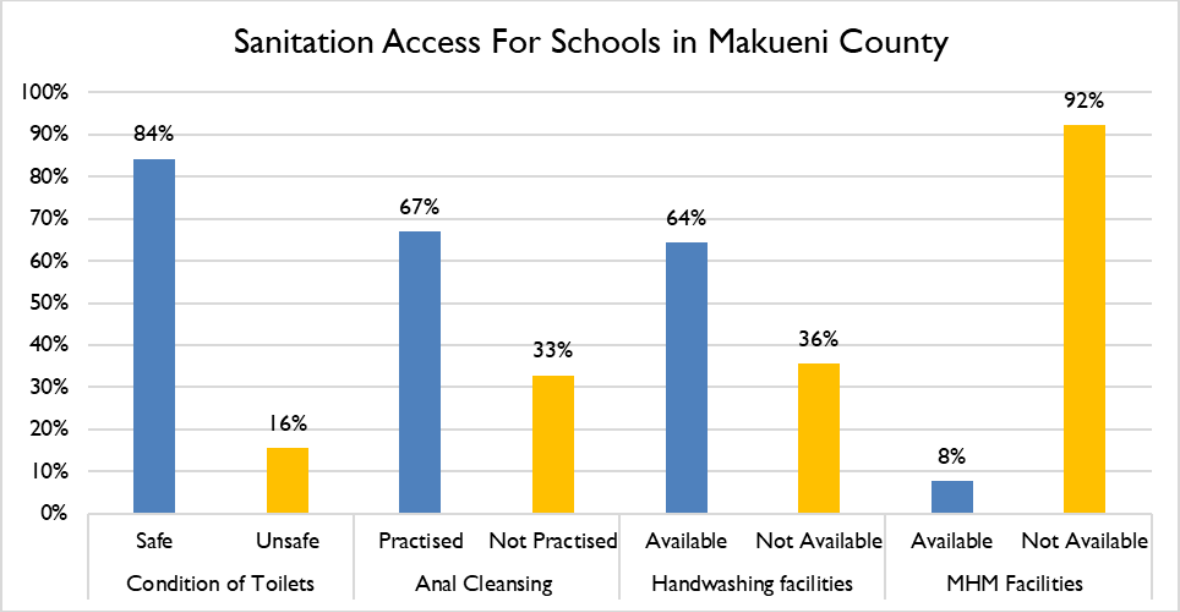


Figure 10: Summary the sanitation accessibility for educational facilities in Makueni County.

WASH in Schools' Implementation Framework

WASH in schools in Makueni will be implemented using the framework for Three-Star Approach for WASH in Schools (WinS) as tabulated below.

Table 35:Three-Star Approach for WASH in Schools (WinS)

Category	WASH Component	Criteria	Indicators
Zero Star	Sanitation	a) No b) toilet at all or dilapidated toilets in poor state of repair and dirty.	a) Open defecation within and around the school. b) Pungent smell within school compound and presence of maggots around and in the toilet. c) No evidence of assigned responsibilities for cleaning and maintenance of sanitation facilities.
	Water	No drinking water for pupils	No functional drinking water supply
	Hygiene	No handwashing facilities at critical points	No handwashing facilities with running water and soap
	Environmental cleaning	Untidy school environment	No cleaning plan/roster
	Waste management	No waste management measures in place	No waste collection and disposal facilities in school

Category	WASH Component	Criteria	Indicators
One Star	Sanitation	Available toilets in usable conditions that are private i.e. have doors that can be closed though inadequate as per school's enrolment.	a) Available toilets in usable condition b) Duty roster for cleaning of toilets and cleaning materials c) 1:50< Toilet Ratio for Girls and 1:60< For Boys and Functional and Well Site d) Absence of Daily Toilet Cleaning Roster e) No Segregation of Toilets
	Water	Available drinking water	Available drinking water
	Hygiene	Available hand washing facilities with soap and water in critical points	a) Designated hand washing points b) Hand washing station available
	Environmental cleaning		a) Well maintained and clean ground b) Demarcation of school done
	Waste management		Designated waste collection point
Two Star	Sanitation	a) Adequate toilets to serve school's b) enrolment, in usable condition and private. Operation and maintenance of sanitation facilities	a) Adequate toilets in good condition segregated to serve girls, boys and physically challenged pupils. b) 1:50 toilet ratio for girls and 1:60 for boys and functional and well sited c) Boys' urinal d) Special needs block e) Bathroom for girls f) No rampant open defecation Suitable distance between segregated toilets
	Water	Safe drinking water	a) Available drinking water either from home or availed in school b) 1 litre of treated water per child per day with own container
	Hygiene	Enough handwashing facilities with soap and water	a) Presence of adequate hand washing facilities with soaps and water in both critical areas. b) Reminders of handwashing i.e. posters and talking walls. c) Provision sanitary towels d) Hand washing station e) Presence of school health club f) Some efforts for anal cleaning materials g) Group hand washing with soap before school meal
	Environmental cleaning	Clean and tidy school compound	a) Duty rosters available for cleaning of sanitation facilities and cleaning materials. b) Clean compound and well maintained c) Adequate waste bins at strategic points

Category	WASH Component	Criteria	Indicators
			d) Adequate lighting and ventilation e) Spacing between students to be 3feet apart f) Partially fenced school compound
	Waste management		Compost pit
Category	WASH Component	Criteria	Indicators
Three Star	Sanitation	a) Adequate, clean and private toilets to serve school's enrolment as per recommended ratio and in good usable condition. b) Operation and maintenance of sanitation facilities	a) Adequate toilets functional and well sited as per the recommended ratio of 1:30 for boys and 1:25 for girls. b) Segregated toilets for girls, boys and learners with special needs/physically challenged learners c) Boys urinal d) Urinal for girls in early years of education – pp1-g3 e) Anal cleaning material f) Special needs block g) Bathroom for girls h) No open defecation i) Clear signage of washrooms j) Segregation of toilet facilities
	Water	Safe and adequate drinking water	a) Readily available safe drinking water b) 2.5 litres of treated water per child per day with own container
	Hygiene	a) Enough handwashing facilities with soap and water b) Availability of menstrual hygiene management products	a) Presence of adequate handwashing facilities in the school compound with enough water and soap b) Reminders of handwashing i.e. posters and talking walls c) Available menstrual hygiene products d) Provision of sanitary towels e) Hand washing station with soap in appropriate place f) Hygiene education g) Active school health club h) Talking walls i) Availability of cleaning materials j) Frequency logbook for cleaning
	Environmental cleaning	a) Clean and tidy school compound b) Preparation and serving of food in a	a) Duty roster available for cleaning and the sanitation facilities are in good condition b) Clean compound with no litter and maintained

Category	WASH Component	Criteria	Indicators
		clean environment. c) Well ventilated and lit food storage facilities	c) Waste bins at strategic points d) Adequate lighting and ventilation – 20 per cent of floor area, 50 per cent openable e) Spacing between students to be 3 feet apart f) Fenced school compound
	Waste management		a) Presence of a designated compost pit/ garbage management system for both sanitary and general waste b) Presence of: c) Sanitary bins d) Fenced refuse pit – 0.5m e) System of waste disposal in collaboration with MOH f) Rubbish bin for every classroom g) Wastewater recycling for tree planting and irrigation

Health Center Facilities Sanitation Access

The health centre facilities considered are both out-patient and in-patient (Level II and Level III). A total of 226 health centre facilities were surveyed in December 2024. All health centre facilities in Makueni County have access to a toilet facility. However, only 80% of the facilities have toilets that are safe for use. Anal cleansing is practiced in 164 (73%) health facilities in Makueni County. 198 (88%) of health center facilities have an operational hand washing facility while only 19 (8%) of health centre facilities have functional Menstrual Hygiene Management (MHM) facilities.

The Figure below summarizes the sanitation accessibility for health centre facilities in Makueni County.

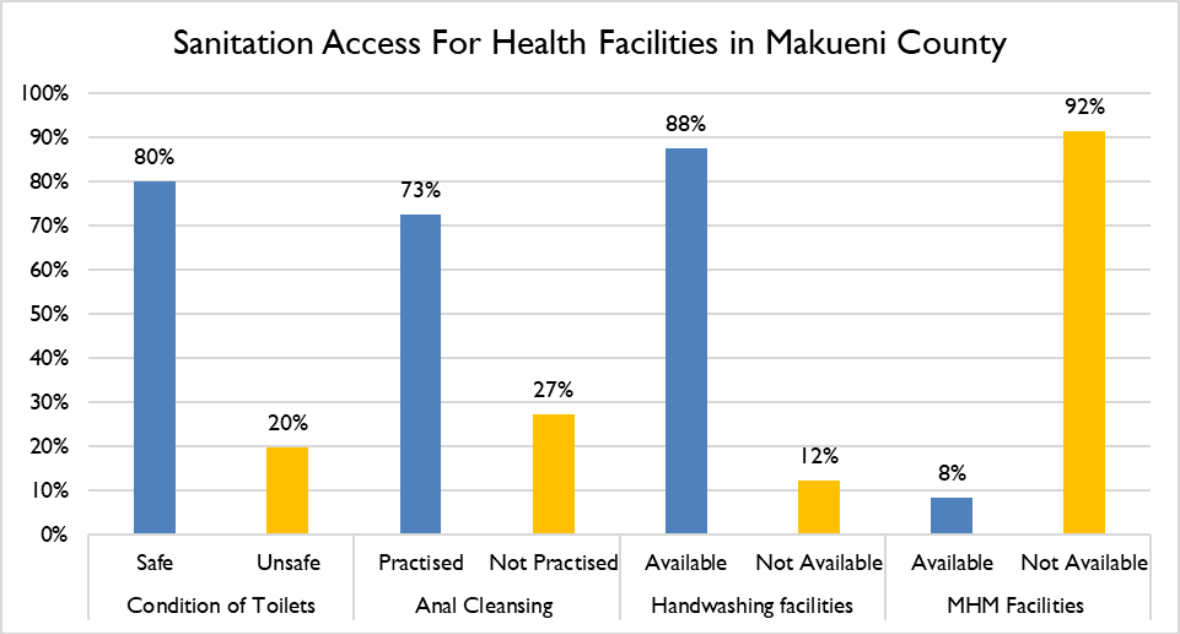


Figure 11:sanitation accessibility for health centre facilities in Makueni County.

Assessment of current operation and maintenance modalities in delivering WASH services for school and healthcare facilities

The delivery of Water, Sanitation, and Hygiene (WASH) services in schools and healthcare facilities is critical for ensuring health, safety, and educational outcomes. However, the effectiveness of these services largely depends on the operation and maintenance (O&M) modalities in place. This assessment focuses on the current practices, challenges, and recommendations for improving WASH services in Makueni County.

Current Operation and Maintenance Modalities

a) Water Supply Management

i. Infrastructure: Many schools and healthcare facilities have water supply systems, including boreholes, piped water, and water tanks. However, the reliability of these systems varies significantly.

ii. O&M Practices:

- Regular Inspections: Some facilities conduct regular inspections of water supply systems, but this is not consistent across all institutions.
- Maintenance Protocols: There is a lack of standardized maintenance protocols for water supply systems, leading to inefficiencies and breakdowns.
- Community Involvement: In some cases, community members are involved in the management of water supply systems, especially the county borehole projects who in turn supply water to schools and the health facilities.

b) Sanitation Facility Management

i. Infrastructure: All schools and healthcare facilities have access to toilet facilities, but the quality and safety of these facilities vary.

ii. O&M Practices:

- Cleaning and Maintenance: Many facilities lack a regular cleaning schedule, leading to unhygienic conditions. In some cases, cleaning is done sporadically, often depending on available resources.
- Functional Hand Washing Stations: While many facilities have handwashing stations, the maintenance of these stations is often inadequate. Soap and water are not consistently available.
- Menstrual Hygiene Management (MHM): schools with MHM facilities often lack proper maintenance and supplies, limiting their effectiveness.

c) Training and Capacity Building

i. Staff Training: There is a need for more comprehensive training programs for staff responsible for managing WASH services. Many staff members lack the necessary skills and knowledge to effectively maintain water and sanitation facilities.

ii. Health Education: Community awareness programs on the importance of WASH services are limited, which affects the overall management and sustainability of these services.

Challenges in Current O&M Modalities

a) Resource Constraints: Limited financial resources hinder the ability to conduct regular maintenance and repairs of WASH facilities.

b) Inconsistent Supply of Water and Sanitation Materials: Many facilities face challenges in obtaining necessary supplies, such as cleaning materials, soap, and sanitary products.

c) Lack of Accountability: There is often a lack of clear accountability for O&M responsibilities, leading to neglect and poor service delivery.

d) Inadequate Monitoring and Evaluation: The absence of effective monitoring and evaluation systems makes it difficult to assess the performance of WASH services and identify areas for improvement.

Assessment of current financing modalities in delivering WASH services for school and healthcare facilities

Financing is a critical component in the delivery of Water, Sanitation, and Hygiene (WASH) services, particularly in schools and healthcare facilities. Adequate funding ensures the construction, operation, and maintenance of WASH infrastructure, which is essential for promoting health and educational outcomes.

County Government Funding

a) County Budget Allocations: The Makueni County government allocates a portion of its budget to WASH services, which includes funding for infrastructure development, maintenance, and operational costs in schools (ECDEs and County Technical Institutions – CTTIs) and healthcare facilities. However, it does not allocate WASH budget to Primary, Secondary and National technical institutions.

b) Sector-Specific Programs: Specific programs aimed at improving WASH services need to receive targeted funding based on budget priorities.

External Funding Sources

a) **Donor Funding:** Various international organizations and NGOs provide financial support for WASH initiatives in Makueni County. This funding often targets specific projects, such as the construction of latrines, CHAST in schools and the installation of water supply systems e.g. Mifuko Trust, WHH, World Vision Kenya, Water Mission Kenya etc.
b) **Public-Private Partnerships (PPPs):** There's a need for Some initiatives involving partnerships between the government and private sector entities to finance WASH projects. These partnerships can leverage additional resources and expertise.

Community Contributions

Local Contributions: Communities contribute financially or in-kind (e.g., labor, materials) to WASH projects, particularly in rural areas. This local involvement enhances ownership.

User Fees: Cost Recovery Mechanisms: In some cases, schools and healthcare facilities implement user fees for water services to help cover operational costs. However, this approach can be challenging in low-income areas where families struggle to pay.

Recommendations for WASH Implementation

Sustainable Development Goal (SDG) 6 globally recommends basic water access of 60% by 2022, 80% in 2025 and 100% by 2030. In comparison, the global targets to universal coverage of basic hygiene and hand washing services in healthcare facilities was agreed to be 50% by 2022, 80% by 2028 and 100% by 2030. To achieve this, the following recommendations will be necessary for the achievement of the WASH in healthcare facilities identified gaps in the county.

Table 36: Recommendations For The Achievement Of The WASH In Healthcare Facilities Identified Gaps In The County

Thematic Area	Identified Gaps	Key Recommendations to County Health Management Team (CHMT)
Sanitation	Inadequate provision of sanitary facilities at 54% in at least 4 toilets for outpatient setting or at least 1 per 20 users for inpatients. Level 2, 3 and 4 contributed more to the inadequacy level.	a) Increase the number of sanitary facilities for staff and health care workers both in the inpatients and outpatient facilities. b) Increase facilities in AWPS and follow up on the resource allocation c) Dissemination of wash assessment tools and policy documents.
	About half of the health facilities have not provided facilities that are clearly separated for staff and patients with Level 2, 3 and 4 bearing the highest burden of inadequacy.	Facilitate the separation of sanitary facilities for staff and patients.

Thematic Area	Identified Gaps	Key Recommendations to County Health Management Team (CHMT)
	Almost all the facilities (93%) of the accessed facilities lacked at least 1 toilet in the ward meeting the needs of persons with special needs and disability.	Full compliance with the provisions of persons with disabilities act.no 14 of 2003 and other relevant policy documents on disability.
	Most facilities by level and county did not have adequate provision for at least one toilet that provides for MHM NEEDS, (90%) inadequacy.	a) Advocating for provision and dissemination of the MHM Policy and capacity building Advocacy through capacity building. b) Priorities inclusion of the MHM activities in the AWPs and CIDPs. c) Strengthen private public partnerships
Water supply	36.3% of facilities had inadequate water supply, most affected were especially in levels 2 and 3	a) Ensure the provision of 100% water supply to health facilities b) Anchor provision of water supply to health facilities in the CIDPs c) Inter-sectoral collaboration and Public Private Partnership (PPP)
	Almost 50 % of health facilities had Inadequate clean safe water supply with level 2 being the most affected	d) Ensure 100% provision of clean safe water
Hand Hygiene	Only 51.7% of health facilities had functioning hand hygiene stations at all point of care with levels 4& 5 being most affected.	a) Provide fixed standard/ permanent hand hygiene stations to avoid transfer to non- target areas b) Capacity building and training of Health Care Providers on IPC c) Establish /strengthen/ operationalization of IPC committees at all levels of care d) Include supply of WASH/IPC commodities in the AWP e) Undertake regular maintenance/ replacement of nonfunctional hand hygiene facilities f) Conduct scheduled and regular support supervision/ monitoring and evaluation to ensure functional hand hygiene stations in all points of care g) IPC committees to undertake quarterly hand hygiene assessments h) Inter-sectoral collaboration & PPP
	Most of the facilities (63.6%) had Inadequate availability of functional hand hygiene stations within 5 M of the latrine	a) Installation of hand hygiene station near the latrines b) Capacity building and training of Health Care Providers on IPC. c) Scheduled and regular Support Supervision/ monitoring and evaluation to ensure functional hand hygiene stations next to the latrine.
	Inadequate availability of hand hygiene stations at waste disposal area (4 in 5 HF)	a) Provide/ upscale functional hand hygiene stations at the waste disposal areas b) Scheduled and regular Support Supervision/ monitoring

Thematic Area	Identified Gaps	Key Recommendations to County Health Management Team (CHMT)
		and evaluation of waste disposal areas
	Inadequate availability of hand hygiene protocols (3 in 4 HF)	a) Development/ provision of hand hygiene Protocols b) Sensitization of workers on hand hygiene protocols
	Inadequate hygiene protocols with a dedicated staff roster (9 in 10 HF)	a) To develop a hand hygiene roster and displayed at strategic areas within the facilities b) Regular monitoring of the signing of the staff roster
	Inadequate clearly visible hand hygiene promotion materials at key places (3 in 4 HF)	a) Provision of hand hygiene promotion materials at all key places e.g., hand hygiene stations b) Provision of notice board for mounting of the hand hygiene promotion materials
PPEs	PPE inadequacy level averagely stood at 78% across all Counties and all levels of care.	a) Strengthening of Procurement and supply chain of appropriate PPEs by capturing in the CIDPs and AWP b) Capacity building of Health Care waste managers and handlers on appropriate handling use storage and disposal of PPEs. c) Formulation, implementation and enforcement of relevant policy guidelines to enhance compliance on use, storage and disposal of PPEs. d) Adopt a clear separation of roles for streamlining of services across department in health facilities.
Cleaning	Inadequate cleaning records with only 8% of health facilities assessed having records signed by the cleaner and countersigned by the supervisors.	Provide and implement cleaning records with provision for signing
	Lack of prioritization of cleaning materials in county/ facility level planning processes	Advocate for prioritization of cleaning materials during county budgetary processes
	Almost all the facilities by level and dispensaries did not have a cleaning roaster displayed. (97%)	a) Form, Operationalize and strengthen the IPC committees as per the IPC guidelines. b) Integrate IPC in WASH c) Coordinated follow ups within health facilities to ensure compliance.
	Lack of proper monitoring and evaluation system for cleaning	The county to put in place monitoring and evaluation mechanism for facilities cleaning processes

Thematic Area	Identified Gaps	Key Recommendations to County Health Management Team (CHMT)
	Poor attitude among the cleaners and supervisors on availing the records	The county should sensitize the cleaners and their supervisors on the need to keep proper cleaning records well signed by both the cleaner and the supervisor.
	Lack of adequate cleaning materials	The county should avail budgetary allocation for cleaning materials
Decontamination and Sterilization	Inadequate decontamination areas in some health facilities	Individual health facilities should conduct facility analysis on decontamination areas and fill the identified gaps
	21% of facilities lacked availability of sterilized and disinfected equipment at some levels 2, 3	The county to provide focus on always availing sterile and disinfected equipment for use in LEVEL 2, LEVEL 3.
	Lack of budgetary allocation for Procurement of decontamination and disinfection equipment	a) Counties should implement pull system in procurement of decontamination and disinfection equipment b) Counties should improve sterilization of equipment from 79% to the desired target of 100%.
Waste management	20% of facilities had inadequate functional pits for disposal of non-infectious wastes among most health facilities.	The county should put in place mechanisms for the transportation of solid wastes from lower-level facilities to others with Incinerators or alternative technologies for waste treatment
	Lack of proper waste management practices in most health facilities across the counties	a) The county to sensitize the waste management team/HCWs through regular CMEs in all health facilities on proper health care waste management practices and the prevailing guidelines including implementing the 3R principles (Reduce, Reuse and Recycle) non-infectious waste. b) Provision of health care waste management commodities
	Lack of waste management framework	Subsequently, the health facilities with the county should sensitize the waste management team/HCW on proper waste management and the prevailing guidelines / policies/ Standards
	Lack of proper waste treatment mechanism in most of the lower-level health facilities	Establish alternative pool system of medical waste treatment for lower levels of care
Isolation	The county health facilities across all levels lacked single patient rooms for co-horting patients with similar patients at 77% health facilities rated as	a) The county to prioritize provision of such rooms to reduce the risk of transmission of highly infectious and contagious diseases that require isolation of patients and protection of health care workers. b) Capacity building on of Health managers at all levels on the importance of ensure provision of the rooms for

Thematic Area	Identified Gaps	Key Recommendations to County Health Management Team (CHMT)
	inadequate.	cohorting patients with similar illness. c) Enforcement of the public health act cap 242 on isolation and any other relevant policy and legislation documents on isolation.
General Recommendations		a) The county to provide high level advocacy for reduced hospital acquired infections as County Infection Prevention Control Goodwill Ambassadors b) The CHMTs to undertake similar assessments on an annual basis to coincide with the global annual reporting using the standardized tool and populate dataset in the WHO portal for expanded country coverage and prompt analysis c) The county to put in place monitoring and evaluation mechanism for health facilities cleaning processes including proper cleaning records well signed by both the cleaner and the supervisor d) Establish effective incinerators in level 4 and 5 facilities, and alternative pool system for managing medical waste treatment from lower levels of care (Level II and III) e) The county WASH unit could implement pull system in procurement of decontamination and disinfection equipment f) Sensitize the waste management team/HCW on proper waste management and the prevailing guidelines / policies/ standards g) The county should put in place mechanisms for the transportation of solid wastes from lower-level facilities to others with incinerators or alternative technologies for waste treatment h) Establish alternative pool system of medical waste treatment for lower levels of care including innovative technologies in waste management e.g., non-burn technologies, green energy, and solar power (as captured in the Makueni county energy plan)

2.4.2 Hygiene promotion programs in educational and health care facilities

Current health and hygiene awareness initiatives.

According to 2024 KWASH survey, 698 (71%) schools in Makueni County have access to water throughout the year, 216 schools (22%) have access to water with irregular supply, while 73 schools (7%) do not have access to water all year round. All schools (987) in Makueni County have access to a toilet facility. However, only 84% of the educational facilities have toilets that are safe for use. Anal cleansing is practiced in 653 (67%) schools in Makueni County. 636 (64%) of schools have an operational

hand washing facility while only 77 (8%) of schools have functional Menstrual Hygiene Management (MHM) facilities. In addition, access for pupils per door is 1:17 for girls and 1:20 for boys (KWASH survey, 2024).

In Makueni, current health and hygiene awareness initiatives in schools and health facilities emphasize improved sanitation, access to clean water, and hygiene education. Programs like WASH and efforts by the county and partners aim to create health-promoting environments that enhance student well-being and community health.

Key Initiatives in Schools

1) **WASH Program**: Focuses on improving water, sanitation, and hygiene (WASH) in schools. Advocates for policy changes within the Government of Kenya to enhance school WASH funding. Emphasizes the importance of girls' attendance and provision of sanitary pads.
2) **Curriculum Integration:** Hygiene education is integrated into school curricula to instill good practices among students. Training teachers to effectively deliver hygiene education.
3) **Community Engagement:** Involves parents and local communities in hygiene promotion activities. Encourages community ownership of sanitation facilities.

CHAST program

1) **Personal Hygiene:** Education including Hand Washing, Oral Hygiene, Menstrual Hygiene Management etc
2) **Sanitation Practices:** Proper Toilet Use, Waste Disposal: Teach children about the importance of proper waste disposal and the impact of littering on health and the environment.
3) **Environmental Hygiene:** Clean Surroundings
4) **Health Education:** Understanding Germs and Diseases
5) **Interactive Learning:** Workshops and Demonstrations e.g. games and Competitions:

Health Facilities Initiatives

1) **Collaboration with Health Organizations:** Partnerships with organizations like UNICEF and WHO to implement hygiene programs in health facilities. Focus on training healthcare workers on hygiene practices to prevent infections.
2) **Infrastructure Improvement:** Upgrading sanitation facilities in health centers to ensure clean and safe environments for patients. Ensuring access to clean water for both patients and healthcare providers.
3) **Awareness Campaigns:** Conducting campaigns to raise awareness about hygiene practices among patients and staff. Distribution of educational materials on hygiene and sanitation.

Potential Areas for Improvement and Expansion

In Makueni, potential areas for improvement and expansion in WASH services in schools and health facilities include enhancing infrastructure for water and sanitation, increasing access to hygiene education, and integrating WASH programs into health services. Additionally, fostering community involvement and ensuring sustainable funding can significantly strengthen these initiatives.

Infrastructure Development

1) ***Upgrading Facilities:*** Invest in modern sanitation facilities that are gender-sensitive and accessible for all students. Ensure reliable water supply systems in schools and health facilities to prevent shortages.
2) ***Maintenance Programs:*** Establish regular maintenance schedules for WASH facilities to ensure they remain functional and hygienic. Train school staff and health workers on basic maintenance and repair of WASH infrastructure.

Hygiene Education Expansion

Comprehensive Training: Create age-appropriate educational materials that engage students and promote hygiene practices. Develop training programs for teachers and health workers on effective hygiene education techniques. Implement peer-led initiatives where students educate each other about hygiene and sanitation. Formation of school health clubs to foster leadership and responsibility in WASH matters

Community Engagement and Involvement

1) ***Partnerships with Local Organizations:*** Collaborate with local NGOs and community groups (CHPs) to enhance WASH initiatives and reach more beneficiaries. Involve parents in WASH programs to create a supportive environment for students.
2) ***Awareness Campaigns:*** Launch community-wide campaigns to raise awareness about the importance of WASH in schools and health facilities. Utilize local media and social platforms to disseminate information and engage the community.

Sustainable Funding and Policy Advocacy

1) ***Government Support:*** Advocate for increased government budget allocations for WASH programs in schools and health facilities. Encourage the development of policies that prioritize WASH as a critical component of health and education.
2) ***Innovative Funding Model:*** Explore partnerships with the private sector to fund WASH initiatives through corporate social responsibility programs. Implement community-based financing models to support local WASH projects.

Monitoring and Evaluation

1) ***Data Collection and Analysis:*** Establish systems for regular monitoring and evaluation of WASH programs to assess their effectiveness and impact. Use data to inform decision-making and improve program implementation.
2) ***Feedback Mechanisms:*** Create channels for students, parents, and health facility users to provide feedback on WASH services. Use feedback to make necessary adjustments and improvements to existing programmes.

2.4.3 Challenges and gaps in service provision

Menstrual hygiene management approaches

Menstrual Hygiene Management (MHM) encompasses various approaches aimed at ensuring that menstruating individuals can manage their menstruation safely, hygienically, and with dignity. The approaches include:

a) Provision of menstrual health education to pupils and engaging communities to reduce stigma and promote understanding of menstrual health.
b) Ensuring the availability of a variety of menstrual products for pupils (pads, tampons, menstrual cups) at affordable prices.
c) Provision of clean and safe sanitary facilities with water access for handwashing.
d) Establishing proper disposal methods for menstrual products to reduce environmental impact and promote hygiene.
e) Advocacy for policies that support MHM, including tax exemptions on menstrual products and inclusion in healthcare.
f) Promoting gender equality and addressing the social and cultural barriers related to menstruation.
g) Providing access to healthcare services for menstrual-related issues, including pain management and reproductive health education.
h) Conducting research (M&E) to assess the effectiveness of MHM programs, identify gaps in services, and use the data to inform policies and practices related to menstrual health.
i) Engaging males and boys in discussions about menstruation to foster understanding and support, as well as training peers to educate other pupils about menstrual hygiene and health.

Menstrual hygiene management (MHM) is a critical aspect of WASH services, particularly in schools and healthcare facilities. However, several challenges and gaps hinder effective MHM approaches in Makueni.

Lack of Awareness and Education

Limited Knowledge: Many girls and women lack adequate knowledge about menstruation, hygiene practices, and the importance of MHM, leading to misconceptions and stigma.

Insufficient Training for Educators: Teachers and health workers may not receive adequate training to provide accurate information and support to students regarding menstrual health.

Inadequate Infrastructure

Insufficient Sanitary Facilities: Many schools and health facilities lack private, clean, and safe toilet facilities for girls, making it difficult to manage menstruation discreetly.

Lack of Water Supply: Inadequate access to clean water in schools and health facilities hampers the ability to maintain proper hygiene during menstruation.

Limited Access to Menstrual Products

Affordability: Many girls and women cannot afford menstrual hygiene products, leading to the use of unsafe alternatives (e.g., rags, leaves) that can pose health risks.

Availability: In rural areas, access to menstrual products can be limited, with few shops or vendors offering these items.

Cultural and Social Barriers

Stigma and Taboos: Cultural beliefs and taboos surrounding menstruation can lead to shame and isolation for menstruating individuals, discouraging open discussions and support.

Gender Inequality: Societal norms may prioritize boys' education over girls', leading to higher absenteeism among girls during their menstrual periods.

Inadequate Policy and Support Frameworks

Poor dissemination of Policies: The government has policies and guidelines that address MHM but dissemination to the grass roots is poorly done leading to fragmented approaches.

Insufficient Government Support: Limited government investment in MHM programs and infrastructure can hinder the implementation of effective solutions.

Monitoring and Evaluation Gaps

Lack of Data: There is often insufficient data on the specific needs and challenges related to MHM, making it difficult to design targeted interventions.

Inadequate Evaluation Mechanisms: Many MHM programs lack robust monitoring and evaluation frameworks to assess their effectiveness and impact.

Environmental Concerns

Waste Management: The disposal of menstrual products can pose environmental challenges, particularly in areas without proper waste management systems.
Sustainability of Products: The environmental impact of disposable menstrual products raises concerns about sustainability and the need for eco-friendly alternatives.

Medical waste management approaches

Medical waste management is a critical aspect of healthcare that ensures the safe handling, treatment, and disposal of waste generated in healthcare facilities. Effective management of medical waste is essential to protect public health, prevent environmental contamination, and comply with regulatory requirements. key approaches to medical waste management:

Segregation of Medical Waste

Color-Coded Bins: Implement a color-coded system for waste segregation at the point of generation. Common categories include:

a) Red Bins: Biohazardous waste (e.g., contaminated materials, sharps).
b) Yellow Bins: Infectious waste.
c) Blue/Black Bins: General waste (non-hazardous).

Training Staff: Provide training to healthcare workers on proper waste segregation practices to minimize contamination and ensure compliance.

The county segregates all medical waste at the point of generation in accordance with the segregation schedules;

Figure 12: Segregation of hospital medical waste

Safe Handling and Storage

Personal Protective Equipment (PPE): Ensure that staff handling medical waste wear appropriate PPE, such as gloves, masks, and gowns, to protect against exposure.

Designated Storage Areas: Establish secure and designated storage areas for medical waste that are clearly marked and accessible only to authorized personnel.

Limited Storage Time: Implement policies to limit the duration of waste storage to reduce the risk of contamination and odor.

Treatment Methods

Autoclaving: The equipment is available at the county referral hospital but there is no structure to aid the team sterilization (autoclaving) for treating infectious waste which in turn effectively kills pathogens and reduces waste volume.

Incineration: Employ incineration for hazardous waste that cannot be treated by other means. This method reduces waste volume and eliminates pathogens but requires proper emission controls.

Chemical Disinfection: Use chemical agents to disinfect liquid waste before disposal, ensuring that harmful pathogens are neutralized.

Transportation and Disposal

Safe Transport: Ensure that medical waste is transported in leak-proof containers to prevent spills and exposure during transit.

Licensed Disposal Facilities: Partner with licensed waste disposal facilities that comply with local regulations for the final disposal of radioactive waste.
Documentation: Maintain accurate records of waste generation, treatment, and disposal to ensure accountability and compliance with regulations.

Training and Capacity Building

Regular Training Programs: Conduct regular training sessions for healthcare staff, support staff and on some occasions the caregivers on medical waste management practices, emphasizing the importance of safety and compliance.
Awareness Campaigns: Implement awareness campaigns to educate staff and the community about the risks associated with improper medical waste management.

Monitoring and Evaluation

Regular Audits: Conduct regular audits of medical waste management practices to identify areas for improvement and ensure compliance with regulations.
Feedback Mechanisms: Establish feedback mechanisms for staff to report challenges and suggest improvements in waste management practices.

Policy and Regulatory Framework

Compliance with Regulations: Ensure that medical waste management practices comply with national and local regulations governing healthcare waste.
Development of Guidelines: Develop and disseminate guidelines for medical waste management tailored to the specific needs of healthcare facilities.
Public Awareness: Engage the community in discussions about the importance of proper medical waste management and its impact on public health and the environment.
Collaboration with Local Authorities: Work with local authorities to develop community-based initiatives for safe disposal of medical waste, especially in rural areas.

Barriers to access sanitation services in schools and healthcare facilities.

Access to sanitation services in schools and health facilities in Makueni County is hindered by various factors that affect both the availability and quality of these essential services. Here are some key barriers:

a) Inadequate Safe Infrastructure

Insufficient Facilities: Despite all public primary schools, ECDEs and health facilities having sanitary facilities, only 84% of the educational facilities and 80% of the healthcare facilities have toilets that are safe for use (Makueni County WASH Survey, 2024). This inadequacy can lead to overcrowding and unsanitary conditions.

Poor Maintenance: Existing sanitation facilities are often poorly maintained, leading to unhygienic conditions that deter use. Regular maintenance is crucial for ensuring that facilities remain functional and clean.

b) Funding Limitations

Budget Constraints: Limited financial resources allocated to sanitation services in schools and health facilities can restrict the development and maintenance of necessary infrastructure. This can result in a lack of essential supplies, such as soap and cleaning materials.

Dependence on External Funding: Many sanitation initiatives rely on external funding or donations, which can be inconsistent. This dependence can lead to gaps in service provision and sustainability.

c) Social Norms and Cultural Practices

Stigma Around Menstrual Hygiene: Inadequate facilities for menstrual hygiene management can discourage girls from attending school, particularly during their menstrual periods.

Community Attitudes: Social norms that prioritize open defecation or inadequate sanitation practices can hinder efforts to promote improved sanitation facilities. Changing these attitudes requires targeted community engagement and continuous health education.

d) Economic Hardships

Poverty: Economic challenges faced by families can limit their ability to support sanitation initiatives in schools and health facilities. Families may prioritize basic needs over sanitation improvements, leading to neglect of these services.

Cost of Maintenance: The financial burden of maintaining sanitation facilities can be overwhelming for schools and health facilities. This can lead to a cycle of deterioration and inadequate service provision.

e) Lack of Awareness and Education

Inadequate Hygiene Education: Many students and health facility users may lack knowledge about the importance of sanitation and hygiene practices. Educational programs are essential for fostering a culture of cleanliness and proper sanitation.

Limited Training for Staff: Health facility staff and school personnel may not receive adequate training on sanitation management, leading to ineffective practices and poor maintenance of facilities.

f) Policy and Governance Issues

Weak Implementation of Health Policies: Existing policies regarding sanitation in schools and health facilities may not be effectively implemented or enforced. This can lead to a lack of accountability and poor service delivery.

Insufficient County and National Government Support: Inadequate political will and commitment to improving sanitation services can hinder progress. County and National Government support is crucial for funding, infrastructure development, and community engagement.

g) Affordability

High Costs of sanitation services: The cost of waste management in schools and health facilities particularly exhaustion of latrines and septic tanks has led to reduced access. Prices of sanitary towels are expensive to low income families making it impossible to implement effective menstrual hygiene practices.

h) Geographical Barriers

Rural vs. Urban Disparities: Individuals living in rural areas may face greater challenges in accessing sanitation services due to Markets that do not have public toilets since priority has been given to urban markets.

Psychosocial Barriers

Fear and Anxiety: Fear of judgment or stigma can prevent individuals from seeking healthcare or discussing their needs, particularly regarding sensitive issues like reproductive health and hygiene.

Strategies for improving inclusivity and sustainability.

1. Education and Awareness Campaigns: Implement comprehensive education programs to raise awareness about menstruation and hygiene practices among girls, boys, and communities.
2. Infrastructure Development: Invest in building and upgrading sanitation facilities in schools and health centers to ensure privacy and access to clean water.
3. Access to Affordable Products: Facilitate access to affordable and sustainable menstrual products through partnerships with local manufacturers and distributors.
4. Policy Advocacy: Advocate for the development and implementation of comprehensive MHM policies that address the needs of menstruators.
5. Community Engagement: Involve communities in discussions about menstruation to reduce stigma and promote supportive environments for girls and women.
6. Awareness Campaigns: Implement community education programs to raise awareness about health issues, available services, and the importance of hygiene.
7. Subsidized Services: Provide subsidies or financial assistance for healthcare services and sanitary products to improve affordability.
8. Community Engagement: Involve community leaders and members in discussions to challenge harmful social norms and promote positive health behaviors.
9. Policy Advocacy: Advocate for policies that prioritize equitable access to healthcare and sanitation services, particularly for marginalized groups.
10. Infrastructure Development: Improve transportation and infrastructure to enhance access to healthcare facilities and markets.
11. Data Collection and Research: Conduct research to gather data on MHM needs and challenges, informing the design of effective interventions.
12. Establish Standardized O&M Protocols: Develop and implement standardized operation and maintenance protocols for water supply and sanitation facilities in schools and healthcare facilities.
13. Enhance Training Programs: Invest in training programs for staff and community members on WASH management, focusing on maintenance, hygiene practices, and the importance of regular inspections.
14. Strengthen Community Engagement: Foster community involvement in the management of WASH services to enhance accountability and sustainability. This could include forming water and sanitation committees.
15. Secure Funding for WASH Services: Advocate for increased budget allocations and explore innovative financing mechanisms to support the maintenance and improvement of WASH infrastructure.

16. Implement Monitoring and Evaluation Systems: Establish robust monitoring and evaluation systems to track the performance of WASH services, identify challenges, and inform decision-making.

2.5. WASH Plus/Multiple Use Water (MUS) Services

2.5.1 Water needs beyond domestic use, including small-scale irrigation, livestock, and small-scale industry

Assessment of multi-use water demands.

Makueni County has been actively working on improving water access and sanitation through various initiatives, including **Multiple Use Water Services (MUS)** and **WASH Plus** programs. The county government, in collaboration with development partners, has implemented several strategies to enhance water availability, governance, and sustainability.

Makueni County has a diverse range of water use services, catering to various needs. *Table 37* summarizes various uses of water within the County.

Table 37:Summary of Multiple Water Uses within Makueni County

Type of Water Use	Description
Domestic Water Supply	a) **Piped Water:** Urban areas like Wote and Makindu have access to piped water supply, though coverage may not be universal, especially in informal settlements. b) **Boreholes and Wells:** Many rural areas rely on boreholes and wells for domestic water supply. c) **Rainwater Harvesting:** This technique is increasingly being adopted to supplement water supply, especially during dry seasons.
Agricultural Water Use	a) **Irrigation:** Water from rivers, dams, and boreholes is used for irrigation, particularly in areas with fertile soils. b) **Livestock:** Water is essential for livestock, including cattle, goats, and sheep, which are crucial for livelihoods in rural areas.
Industrial Water Use	**Manufacturing:** Industries in the county, such as those involved in food processing and manufacturing, require water for production processes.
Environmental Water Use	**Ecosystem Preservation:** Water is essential for maintaining the ecological balance, supporting biodiversity, and preserving natural habitats.
Other Uses	**Recreational Activities:** Water bodies like rivers and dams are used for recreational purposes, such as swimming and fishing.

2.5.2 Role of water user associations in managing multiple-use Services

Water Users associations (WUAs) play a critical role in managing Multiple Use Water Services (MUS) in Kenya to ensure sustainable and equitable water management. They are community-based organizations that bring together water users and other stakeholders to manage the resources and the services. They undertake several roles including but not limited to catchment conservation, water service provision, conflict resolution, community engagement, assist in policy implementation and at times resource mobilization for the schemes/ projects.

Makueni county has a strong emphasis on community-led development (CLD) and public participation in various sectors, including water management. These overarching principles and structures heavily influence how community-led MUS governance functions. Makueni county has developed a number of frameworks providing basis and direction on MUS governance, for instance, there exists Makueni county Water Act 2020 which establishes MARUWAB as an oversight institution for rural water service provision; it establishes the County WSPs and WUAs among others. There also established several Irrigation water users' associations (IWUAs) as provided by the National Irrigation Authority, dealing with water for agriculture. However, the take up of these models has been albeit slow especially for WUAs due to the required regulatory compliance and the fact that Makueni is generally a rural county.

Strategies to enhance resilience in MUS systems.

Enhancing resilience in Multiple Use Water Services (MUS) systems calls for a holistic framework that integrates technical innovation, adaptive planning, robust governance, and community engagement.

Some of the strategies to enhance resilience in MUS systems include:

- WSPs, WUAs and IWUAs will be strengthened to improve their operations through capacity building programmes, enhancing stakeholder collaboration and adoption of sustainable water management practices
- Exploring diversified funding sources to help sustain their operations
- Strengthening governance through implementing transparent leadership structures and accountability mechanisms
- Climate adaptation strategies through investing in water conservation techniques and irrigation systems

Best practices and capacity-building needs in MUS implementation

Implementing Multiple Use Water Services (MUS) involves, well-established practices and a growing need for capacity-building to ensure that water systems sustainably serve various sectors inclusive of domestic, agricultural, industrial and recreational. The following are some of the best practices and capacity building needs in MUS implementation for at the county level:

Participatory planning; engagement of the local community through the planning process cannot be overemphasized as it's the root to sustainability. As MUS strives to meet multi-dimensional community needs, capacity building including training in community mobilization and participatory planning is key.

Integrated design; this involves designing water systems that are flexible enough to serve multiple functions. This is by creating systems that can deliver potable water for household use, provide irrigation water for smallholder agriculture and even support local small-scale industries. To ensure this, there is need for local expertise and technical skills with knowledge of integrating modern system technologies.

Strategic partnerships; multi-stakeholder coordination is one of the strongest pillar for MUS success, this is because it establishes clear channels for dialogue that helps align objectives, streamline resource mobilization and ensure that policies adapt to local needs.

Operational efficiency; best practices include devising and implementing financial models that ensure cost recovery through affordable tariffs, local revenue generation and setting up local governance structures to oversee maintenance and repairs over the long term. There is a significant need for training county WSPs, local water user groups and governance bodies in financial management, budgeting and strategic planning.

Data management to support data driven decision making remains one of the priority capacity building needs in the county. This is in addition to, policy, advocacy and regulatory strengthening through trainings for duty bearers tailored to understanding the regulatory frameworks around water management.

3.0. WATER AND SANITATION SERVICES INSTITUTIONAL STRUCTURE AND FINANCING

3.1 Sector Governance and Service Delivery Models

3.1.1 Overview of institutions responsible for water and sanitation service provision

The Makueni County Water Policy 2019, Water Act 2020, Water Services Regulations together with the County Environment & Climate Change Policy 2021, Environmental Management Act 2023 and County Climate Change Action Plan 2023-2027 provides the frameworks for water resources and water services management. The Water Act (Section 10) explicitly establishes county WSPs for urban water and sanitation service provision and in Section 20, the Makueni Rural Water Board (MARUWAB) an oversight body for rural water service provision.

The Constitution of Kenya recognizes access to affordable water services as a basic human right for both domestic and commercial use. The duties of both the national and the county governments and the different sector players in the provision of water and sanitation services to its citizens including the cross-county services are provided for by the Water Act, 2016 in the Constitution of Kenya. The general institutional framework for water supply is presented in the Figure 13 below:

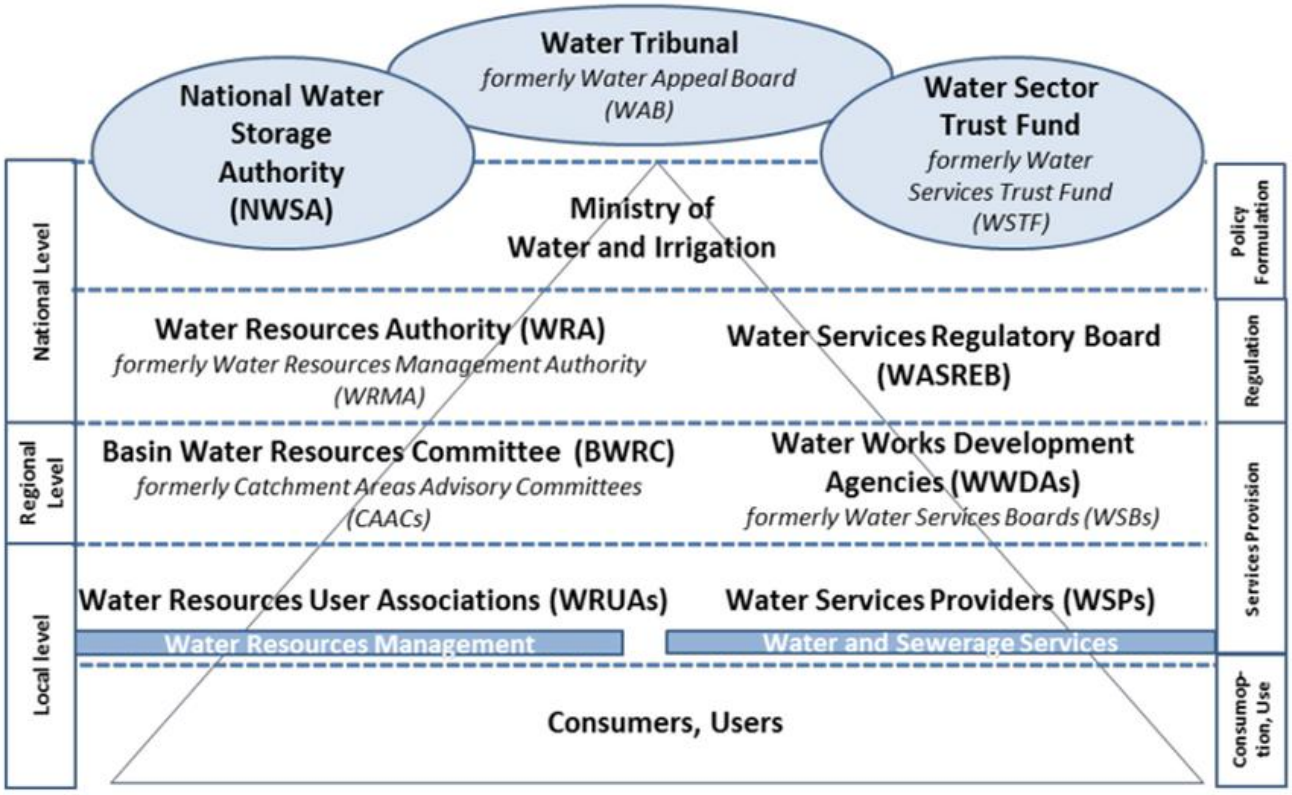


Figure 13: : Institutional Framework for Water Supply and Monitoring
Source: Water Act, 2016

As indicated in Figure 13, provision of water and sanitation services in Kenya is managed at three levels; Local level, regional level and the National level as provided for in the Water Act, 2016. The Water Resources Management Authority (WARMA), currently known as the Water Resources Authority (WRA) serves to formulate and enforce standards, procedures and regulations for the management and use of water resource and flood mitigation, and determine, set permits and water uses fees.

The Water Services Regulatory Board (WASREB) is responsible for licensing Water Service Providers (WSPs), setting standards for water and sanitation services provision, and enforcing compliance to standards. The regulatory agency is an autonomous institution from the Government of Kenya (GoK) and the Ministry of Water, Sanitation and Irrigation (MoWSI).

The roles and responsibilities of the institutions are;

a) Ministry of Water, Sanitation and Irrigation (MoWSI)- It guides and directs the provision of water services, strategy formulation, sector coordination and guidance, and monitoring and evaluation. It is also responsible for overall sector investment planning and resource mobilization.

b) Water Sector Trust Fund (WSTF)- WSTF, formerly the Water Services Trust Fund, is mandated to provide conditional and unconditional grants to counties to assist in the development and management of water services in marginalized and underserved areas.

c) Water Tribunal- The Water Tribunal, formerly the Water Appeal Board (WAB), is mandated to hear and determine appeals at any instance of any person or institution directly affected by the decision or order of the Cabinet Secretary for Water, WASREB, and the WRA, or of any person acting under the authority of the Cabinet Secretary, the WRA, and WASREB

d) National Water Storage Authority (NWSA)- NWSA, formerly the National Water Conservation and Pipeline Cooperation (NWCPC) is mandated to develop large and medium-sized dams for water resource storage and flood control.

e) Water Resource Authority (WRA)- WRA, formerly the Water Resources Management Authority, is mandated to protect, conserve, control, and regulate the use of water resources and flood mitigation through the establishment of a National Water Resource Strategy

f) Water Services Regulatory Board (WASREB)- holds the mandate to set and monitor national standards for water services delivery and asset development. It evaluates, recommends, and approves tariffs; issues licenses; and enforces license conditions to WSPs while protecting the interest and rights of consumers.

g) Basin Water Resources Committee (BWRC)- BWRCs, formerly Catchment Areas Advisory Committees (CAACs), are committees which are to: manage catchments; facilitate the establishment of Water Resource User Associations; play an advisory role to the WRA and county governments; collect and analyze data; and manage information systems on water resources

h) Water Works Development Agencies (WWDAs)- The WWDAs, formerly Water Service Boards (WSBs) are responsible for the development, maintenance, and management of national public water works within their area of jurisdiction.

i) Water Service Providers (WSPs)- WSPs are under the responsibility of county governments who have the mandate to provide water and sanitation services and hold water assets on behalf of the public.

j) Water Resources User Associations (WRUAs)- are community-based associations for collective management of water resources at the sub-catchment level and resolution of conflicts concerning the use of water resources.

k) Water Users Associations, Community Based Organizations – management of small-scale and rural water schemes and support implementation of WASH frameworks.

3.1.2 Role of county government, Water Service Providers (WSPs), and community-based organizations

The County Governments are responsible for providing water and sanitation services in urban, rural and non-commercially viable areas through partnerships with community associations, NGOs, licensed Water Service Providers (WSPs), or private entities. In compliance with the standards of commercial viability set by the Water Services Regulatory Board (WASREB), the county also has the authority to establish WSPs to enhance service delivery.

Since the inception of devolution in 2013, the County Government of Makueni has played a pivotal role in the development and implementation of water and sanitation initiatives. These efforts are driven by relevant county departments, such as the Department in charge of Water and Sanitation matters, which oversees water resource management, and the Department in charge of Environment and Climate Change matters, which ensures sustainable practices and conservation of water catchment areas. The Department in charge of Public Health matters also collaborates in promoting hygiene and sanitation standards to improve public health outcomes. The county boasts of a robust policy, regulatory and institutional frameworks such as the County Water Act, 2020, which establishes Makueni Rural Water Board (MARUWAB) to oversight rural water service provision.

Through these departments, the county has invested in water infrastructure projects, including boreholes, water storage tanks, and pipelines, to enhance access to clean water. It has also supported the construction of sanitation facilities and promoted hygiene awareness campaigns. These initiatives have significantly contributed to improving livelihoods, reducing waterborne diseases, and advancing sustainable water and sanitation practices in Makueni County.

Formal and informal service provision mechanisms (WSPs, Water Users Associations, community committees, private and non-governmental operators.

County Water Service Provider

County Water Service Providers (WSPs) in Kenya play a pivotal role in delivering water and sanitation services at the devolved level. WSPs operate under the oversight of county governments, which are

responsible for ensuring equitable access to safe and affordable water and sanitation services within their jurisdictions; these are KIBMAWASCO, WOWASCO and MBONWASCO in Makueni County. These utilities are tasked with managing water supply systems, including sourcing, treatment, distribution, and maintenance of infrastructure, to serve both urban and rural populations. In addition, to one inter-county WSP namely, NolTuresh Loitokitok Water and Sanitation Company (NOLWASCO) serving Makueni, Machakos and Kajiado counties.

In urban areas, WSPs focus on large-scale infrastructure, including piped water systems, while in rural regions, they often collaborate with community-based organizations to enhance service delivery. Their responsibilities also extend to wastewater management and promoting public health through improved sanitation services.

To ensure sustainability, WSPs are mandated to adopt cost-recovery mechanisms, which include setting tariffs that balance affordability for users with the financial viability of their operations and maintenance. Additionally, these utilities are expected to implement inclusive strategies to cater to marginalized and underserved communities, aligning their services with county development plans and national water access targets.

Existing Formal and Informal Stakeholders

Kenya's water sector comprises a diverse range of stakeholders who contribute to water and sanitation services at various levels. These stakeholders include both formal entities established by law and informal actors who play critical roles in specific contexts, particularly in underserved areas.

Formal stakeholders function within the legal frameworks provided by the Water Act 2016 and the Constitution of Kenya 2010, with responsibilities distributed across national, county, and local levels. At the national level, institutions such as the Ministry of Water, Sanitation, and Irrigation oversee policy development, strategic planning, and standard-setting. Water Resources Authority (WRA) manage water resources, while the Water Sector Trust Fund (WSTF) finances pro-poor projects targeting underserved areas. Additionally, regional Water Works Development Agencies (WWDAs) develop and manage bulk water infrastructure, facilitating large-scale service delivery.

County governments play a critical role under Kenya's devolved system, taking charge of water and sanitation service provision within their jurisdictions. They establish Water Service Providers (WSPs), which are licensed by the Water Services Regulatory Board (WASREB) to ensure operational water and sanitation services. Counties also develop County Integrated Development Plans (CIDPs) to align water and sanitation projects with local needs and national priorities. Furthermore, regulatory bodies like WASREB ensure that water services are affordable, efficient, and of high quality. Environmental and health-related authorities, including the National Environment Management Authority (NEMA) and the Ministry of Health, also play important roles in monitoring compliance with environmental standards and promoting hygiene.

In addition, informal actors are essential, particularly in underserved and marginalized areas. Water Users Associations and Community-Based Organizations (CBOs) manage small-scale water projects and

collaborate with government agencies to implement and maintain local water systems. Non-Governmental Organizations (NGOs) contribute through project implementation, advocacy, and capacity-building initiatives. In areas with limited formal infrastructure, private water vendors, such as kiosk operators and tanker suppliers, provide critical access. Traditional leaders and community groups mediate disputes and manage shared water resources, while informal actors in urban settlements fill gaps left by formal providers.

Below is list of Formal and Informal Stakeholders and the projects/ programme they were involved in for the last 10 years

Table 38: Existing Formal and Informal Stakeholders

S/No.	Partnering Agency/ Organization	Programme/ Project
National Government Affiliated Development Partners		
1.	National Ministry of Water, Sanitation & Irrigation	• Thwake Multipurpose Mega Dam
2.	Water Services Regulation Board (WASREB)	• Regulation of WSPs
3.	TANATHI Water Works Development Agency	• Emali Township water project • Kaiti 4 Water Project • Kamunyolo earth dam distribution
4.	National Drought Management Authority – NDMA	Completed Projects a) Mbasya earth dam in Kalawa Ward, Mbooni b) Ngomeni earth dam in Kathekani Ward, Kibwezi East c) Ulu3 water pipeline extension, Kiimakiu Ward, Kilome d) Ikungu Water pipeline extension in Makindu ward, Kibwezi West e) Kataa water pan in Masongaleni Ward, Kibwezi East f) Mitundu earth dam in Kikumbulyu South Ward, Kibwezi East g) Kwa Kilui earth dam in Kathonzweni Ward, Makueni h) Musele earth dam in Kikumbulyu North Ward, Kibwezi West i) Kamunyuni1 Sand dam in Kikumbulyu North Ward, Kibwezi West j) Kamunyuni2 Sand dam in Kikumbulyu North Ward, Kibwezi West k) Uyi Dam in Masongaleni ward, in Kibwezi East l) Rehabilitation of bore-holes five under CSR (Davies and Shirtliff)
		Ongoing Projects a) Kiboko-Twaandu pipeline extension in Makindu Ward, Kibwezi West b) Athi-Mavindini pipeline extension in Mavindini Ward, Makueni c) Kamunyuni1 Sand dam in Kikumbulyu North Ward, Kibwezi West d) Drilling, equipping and distribution of water in Mbiini borehole in Kasikeu ward e) Rehabilitation of 10 Additional Boreholes under the Kenya Tulindane initiative under the NSCODR

S/No.	Partnering Agency/ Organization	Programme/ Project
5.	Water Services Trust Fund (WSTF)	a) Financing of WSP's in infrastructure development such as: Kitukyumu-Malivani-Mwanzo Pipeline and Machinery Water Projects. b) Financed WSP's to mitigate effects of COVID
Non-Governmental Development Partners		
1.	USAID- KIWASH	Kenya Integrated Water, Sanitation & Hygiene Project Works Done: a) Development of Water Policy & Water Act support b) Swaa water project, Ukia c) Makutano Sinai water project, Wote/ Nziu d) Kanaani water project, Makindu e) Kyulu valley water project, Ivingoni/ Nzambani f) Water mapping of water projects county wide g) Water harvesting and sanitation support in selected schools h) Governance support through training of committees and capacity building of WSP's
2.	World Vision – Kenya	Works Done: a) Kakuli Borehole, Kalawa b) Ngunini Borehole, Kalawa c) Kwa Nzili Borehole, Kalawa d) Kwa Masaku Borehole, Kalawa e) Kyaani Borehole, Kalawa f) WASH business Centre in Kalawa (Continous) g) Tapping of River Athi water – Athi-Kalawa Water, Sanitation & Health programme (AKWASH) – Ongoing h) Household Water Treatment Programme (provision of chlorine-based water treatment chemicals to 2000 HH) i) Kenya Integrated Emergency Response Programme II– funded by USAID

S/No.	Partnering Agency/ Organization	Programme/ Project
3.	WeltHungerHilfe (WHH)	Strengthening access to safe water and enhanced knowledge on Sanitation and Hygiene in Makueni County Works Done: a) Athi-Kaminyuni Borehole, Mtito Andei b) Iaani Borehole, Ivingoni/ Nzambani c) Katheka Kai Borehole, Ivingoni/ Nzambani d) Isunguluni Borehole, Thange e) Nzwii Borehole, Ivingoni/ Nzambani f) Ikungu Borehole, Makindu g) Kisingo Borehole, Makindu h) Kawelu Borehole, Nguumo i) Maumbuni Borehole, Nguumo j) Kadanger Borehole, Makindu k) Katulani Borehole, Nguu/ Masumba l) Matutu Borehole, Nguu/ Masumba m) Support in development of an Asset Inventory for piped water systems using, mWater platform n) Kilumilo Borehole – Mtito Andei o) Katune Borehole – Emali/Mulala p) Kwale Community Borehole – Kasikeu q) Katisaa Borehole – Emali/Mulala r) Mwania Borehole – Kitise/ Kithuki s) Kimboo Borehole – Makindu
4.	Water Mission Kenya	Implementation of safe water projects using a community owned model where the community utilizes locally available materials and fully manages the project from start to the end. Works Done: a) Kinyongo Borehole Safe WP; Ukia b) Mwiveto Borehole Safe WP; Mavindini c) Kavingoni Yemulwa Safe WP; Mavindini d) Kaia Borehole; Kilungu e) Thoma Borehole; Kee f) Mutulani Borehole; Muvau g) Kanzokea Borehole; Kitise h) Kiu Borehole: i) Ngaamba West Borehole j) Watema Borehole; Kee ward k) Kwa Mukonyo Borehole; Nguu l) Kambu Springs; Mtito & Ivingoni
5.	Kenya Red Cross Society	a) Enhanced accessibility to Water and Improved Sanitation Works Done b) Treatment plant facility along Kaiti River, WOWASCO
6.	CESPAD	Capacity building of water management committees in Kibwezi West and Makueni sub counties
7.	KEWASNET	Capacity building of water management committees

S/No.	Partnering Agency/ Organization	Programme/ Project
8.	Neighbors Initiative Alliance (NIA)	Capacity building of water management committees
9.	RUWASCO	Improving the functionality and performance of Rural Water Supply Systems • Twenty-two (22) water schemes trained on Scheme Cloud digital water billing system
10.	Action Aid Kenya	a) Supported construction of Kitise water treatment plant and extension to Ngunguuni and Mau Eli. b) Supported Mukami B pipeline extension from source to Caleb, Kiiaoni to Kimundi with partnership with Safaricom. c) Supported the 27 schools with water trucking and water tanks (250lts) twice in the three locations (Kithuki, Kanthuni and Kanzokeani) d) Mukameni A pipeline extension
11.	USAID – STAWI	a) Kaiti 2 Water Supply Project b) Kamunyolo earth dam c) Mwaani Boreholes Solarization

Rural Water Service Provision

The responsibility for rural water services primarily lies with county governments, as mandated by the Constitution of Kenya 2010 and the Water Act 2016, with support from community-based organizations, NGOs, and other development partners. In Makueni County, as stipulated in the Makueni County Water Act, 2020 there is established Makueni Rural Water Board (MARUWAB) which is mandated to oversee rural water service provision mostly through Community Water Management Committees or Water User Associations (WUAs), which oversee small-scale infrastructure, such as boreholes, shallow wells, and gravity-fed water systems.

These rural systems are often implemented and maintained with the support of county governments, which provide technical assistance, capacity-building, and financial resources. Additionally, NGOs and donor agencies collaborate with local authorities to introduce innovative technologies, such as solar-powered water pumps, automated water dispensers, smart meters, digital billing systems among others, to improve sustainability and efficiency in rural water systems.

3.1.3 Role of communities and community organizations in managing water systems

The communities and community organizations in Makueni County play a vital role in the management and sustainability of water systems, as well as it's the basis for consultations and feedback. Their involvement is crucial for ensuring that water projects meet the needs of the local population, are well-maintained, and contribute to the overall well-being of the community. Some of their key roles include; Participation in Project Identification and Planning; Ownership and Management; Operation and Maintenance; Resource Mobilization; Conflict Resolution; Ensuring Equitable Access; Monitoring and

Accountability; Promoting Water Conservation and Hygiene and Grievance and Feedback Mechanism (GRM).

The county employs several consultations and feedback mechanisms including Grievance Redress Mechanism (GRM); Public Participation Forums; mainstream media; and social media platforms. The approach to community engagement and stakeholder participation through the aforementioned mechanisms is provided as follows:

Grievance Redress Mechanism (GRM): There exists a County '*Grievance Redress Mechanism Framework (2019)'* aimed at '*Strengthening Project-Level Grievance Mechanism for Effective Sustainable Participatory Development and Modeling Communities of Practice'*. The GRM enables the county to receive complaints from project-affected people and communities and serves as a facilitation platform for the response to such grievances by providing support to departments, project teams and communities to address the issues raised in a quick and effective manner. The GRM desk at the county level provides a single entry point to submit complaints directly to the Government and ensures the county's responsiveness and accountability. The GRM serves to complement but not replace the existing legal channels such as courts, tribunals; administrative recording of occurrence books through the county administration and other recourse mechanisms for addressing grievances.

Figure 14 Illustrates the County GRMs System

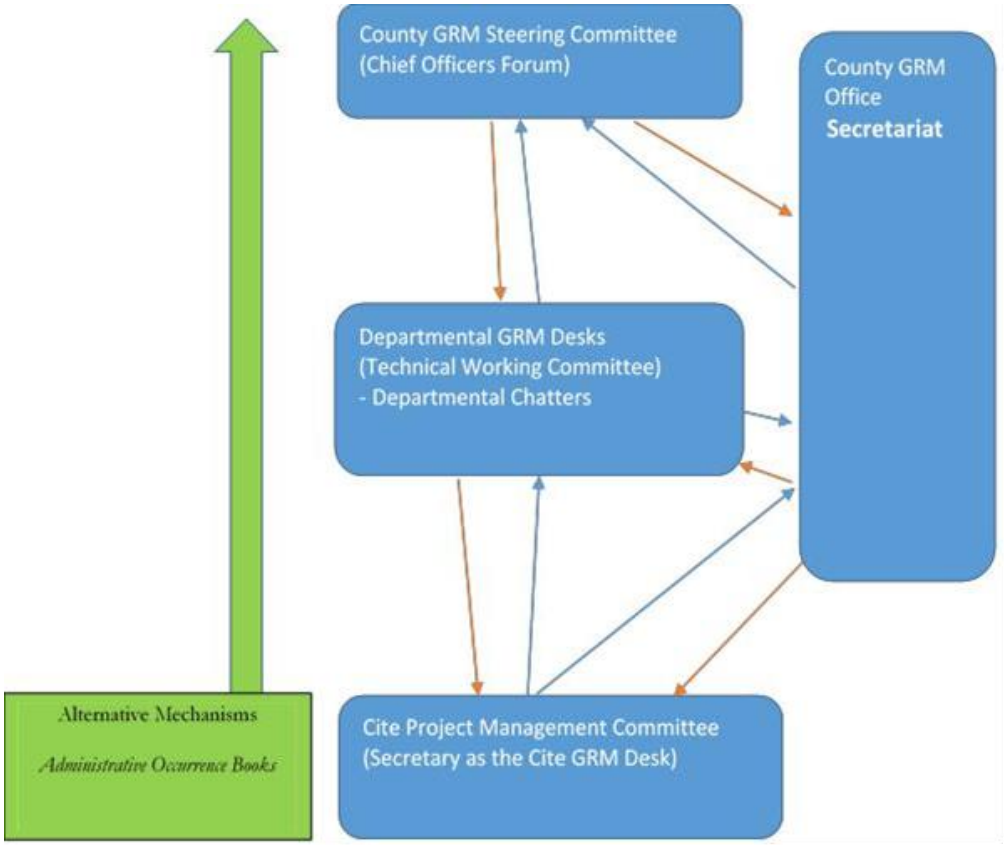


Figure 14:Grievance Redress Mechanism Framework, 2019

Source: *Grievance Redress Mechanism Framework, 2019*

Online GRM Mechanisms

There is also provided for online GRM channel to enable for alternative and wider reach as follows:

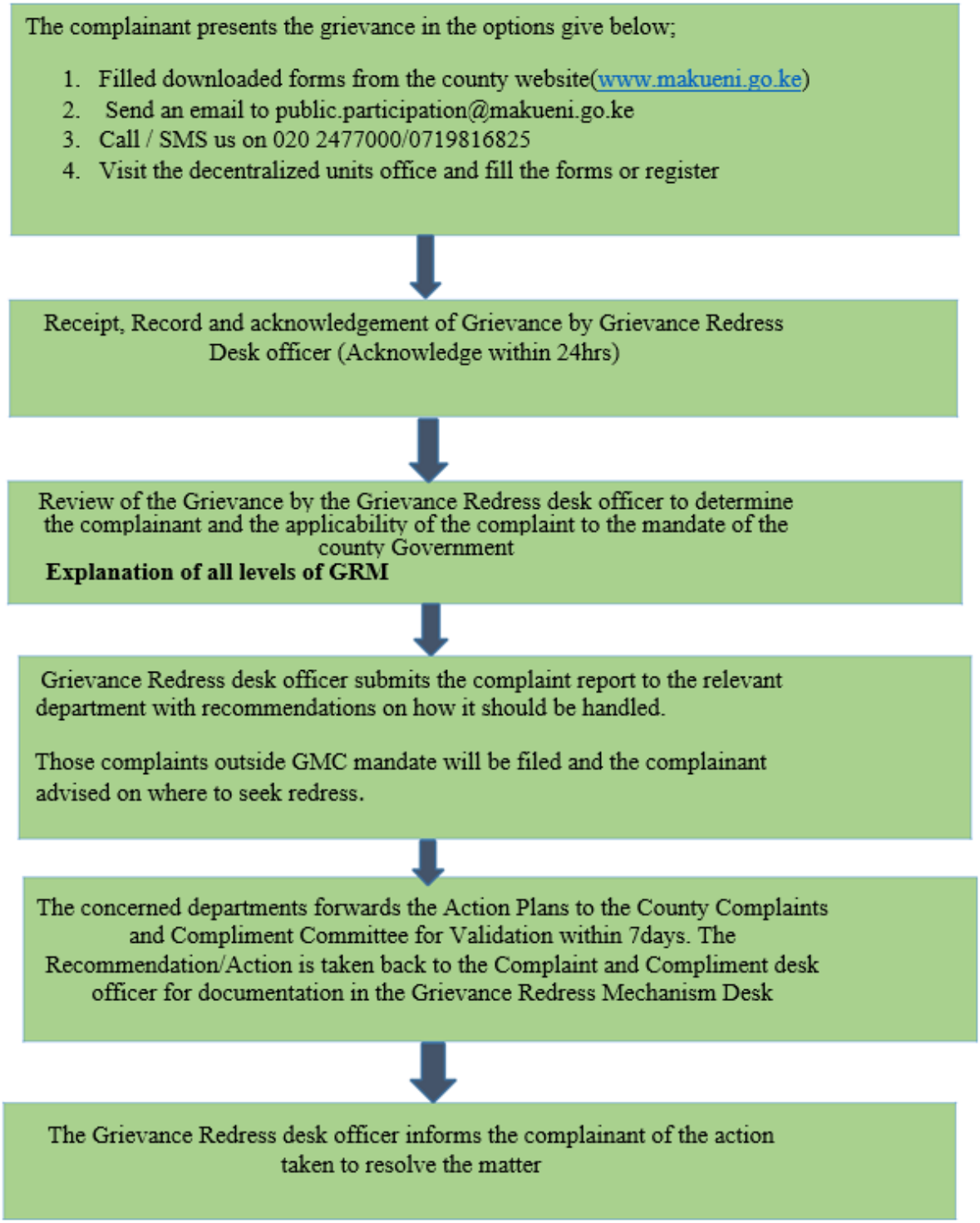


Figure 15:Makueni County Online GRM Mechanisms

The grievances are usually recorded as received. Reporting is done quarterly and annually. The reports clearly state the nature and number of complaints received during the period, number of complaints

resolved, complaints referred to other agencies, the rate of settling complaints, timelines for processing and completion of cases, achievements and challenges and proposed reforms.

Public Participation Forums; The Constitution of Kenya (2010) restructured and transformed the state-society relations in several positive ways. It places the citizens at the centre of development and related governance processes and provides for public participation as one of the principles and values of governance. Cognizant to this, in the county, there exists '*The Makueni County Public Participation Policy, 2021*'. It is the county's overarching framework for participatory development, open government, civic and development education initiatives.

Public participation forums in regards to WASH development has been a priority and through this several infrastructural and governance initiatives have been undertaken. For effectiveness, it is blended with a robust Community Feedback Mechanism which is a two-way process where citizens give their inputs/views on County governance and service delivery processes, and the County Government provides feedback to citizens on their inputs/views in public participation processes and any other governance issues raised by the citizens. Feedback is important in public participation as it contributes to trust and confidence building between the County Government and her citizens.

Media: both mainstream (traditional and modern) and social media are tools utilized to amplify community engagement for consultative and feedback purposes. To keep up with the growing trends, it is blended within GRM and public participation initiatives, as well as, utilized independently as a community engagement mechanism especially locally through vernacular media outlets.

The county actively integrates consultations and feedback mechanisms into decision-making processes, ensuring that policies and development initiatives reflect local needs and aspirations. These mechanisms systematically collects community insights, grievance reports and suggestions, paving the way for accountability and responsive governance This commitment is evident from official reports, some of which can be accessed via https://makueni.go.ke/documents/public-participation-reports/. However, even with these robust mechanisms in place, challenges persist. Reaching every segment of the population – especially marginalized and rural communities – remains a key hurdle. Issues such as the digital divide and logistical barriers sometimes inhibit full participation. Recognizing these challenges, the county has been actively exploring ways to refine its communication channels, including enhancing digital feedback platforms through local media outlets and instituting targeted outreach strategies to ensure that the voices of all community members are heard and addressed

Compliance and enforcement mechanisms.

Given the devolved system in Kenya, Makueni County has the mandate to implement national policies and potentially develop its own county-specific regulations and enforcement mechanisms. Based on the general framework and Makueni County's documented efforts, the following mechanisms are in place:

1. **Existence of County Policies and Regulations:**
    a) Makueni County has developed its own Water Policy (2019) which provides a framework for water and sanitation services within the county. Additionally, there exists Makueni County Water Act (2020) and Water Services Regulations (2021) which provides for penalties and charges of water development and services provision.

b) The Makueni Sand Conservation and Utilization Act, 2022, while focused on sand harvesting, indicates the county's willingness to enact and enforce its own resource management laws, which could extend to water resources and sanitation.

c) Other key county legislations include the Makueni County Environment and Climate Change Policy, 2021; Makueni County Climate Change Act, 2022;

2. **Collaboration with National Agencies:** Makueni County collaborates with national bodies like WASREB to ensure adherence to national standards and regulations in the water services sector. Collaboration with the Ministry of Health on public health matters involves enforcing sanitation and hygiene standards under the Public Health Act.
3. **Community Participation and Monitoring:** Makueni County emphasizes **public participation** in development processes. This extends to community involvement in monitoring the performance of water and sanitation systems and reporting issues of non-compliance. The establishment of Project Management Committees and Project Sustainability Committees elected by communities for water and sanitation projects provides a local oversight mechanism.
4. **Grievance Redress Mechanisms:** Makueni County has a Grievance Redress Mechanism Framework, indicating a system for citizens to report complaints related to service delivery, which includes issues with water and sanitation.
5. **Enforcement Actions:** Working with the security apparatus and judiciary in prosecution of law offenders in relation to water and sanitation offences.

3.1.4 Public-private partnership (PPP) opportunities in service delivery

The National Government Amended Water Act 2016, Now Water (Amendment) Act, 2023. The New Act provides for Public Private Partnerships arrangements and for connected purposes in water delivery services. This new law empowers the National Water Harvesting and Storage Authority and Water Works Development Agencies to engage in bulk water purchase agreements with investors under the Public-Private Partnerships Act under the guidance of the Water Services Regulatory Board (WASREB). The ultimate goal is to enhance water access and economic efficiency in water projects financing and implementation through timely delivery of water infrastructure. With the Water and sanitation function devolved, the Act also provides for the procedure of handing over completed projects to the county government and Cross county water service providers.

The County Integrated Development Plan (CIDP 2023-27) envisioned the establishment of the County Public Private Partnership Unit to promote the participation of the private sector in the county development. The unit is expected to provide the much needed link between the private sector and the county government in an endeavor to enhance external resource mobilization. In the process, a Makueni County Public and Private Partnership Technical Committee has been established to promote PPP projects in the county. Through the Committee, the county government will explore ways of utilizing the Act as it is or domesticating it into the county government legal framework. This will ensure that the projects and programmes envisioned in this investment strategy benefits from the ACT and the Unit.

3.2. Sector Funding Arrangements

3.2.1 Bases of funding (county budgets, national government transfers, development partners, private sector)

Analysis of current funding sources.

WASH funding in Makueni is heavily reliant on public sources, with development partners providing essential support. According to table _ below, the county's budget allocations totaled 4,513 million, representing 73.5% of the total, while partner contributions amounted to 1,630 million, or 26.5% as from 2020 to 2024. The following non-state actors have played a crucial role in supporting WASH interventions in Makueni County: Water Mission, Africa Sand Dam Foundation, World Vision, Welthungerhilfe (WHH), USAID STAWI, Project Maji, JICA, and the Turner Foundation. Over a five-year period, these partners collectively invested KES 1.63 billion in the sector, representing approximately 26% of the total WASH funding. During the same period, the County Government allocated KES 4.5 billion, underscoring the essential complementary role of development partners in enhancing water, sanitation, and hygiene services.

Millions (000,000)

Year (Fy)	County Budget	Partners Budget	Total Budget	Resource Requirements (CIDP II & III)	Funding Gap	Gap(%)
2020/21	1,125.36	278.00	1,403.36	2,500.00	-864.43	(0.35)
2021/22	1,100.91	348.00	1,448.91	3,000.00	-1,361.9	(0.45)
2022/23	779.36	271.00	1,050.36	3,350.00	-2,214.1	(0.66)
2023/24	869.29	311.00	1,180.29	3,665.00	-2,467.17	(0.67)
2024/25	638.44	422.44	1,060.88	7,220.40	-5,865.63	(0.81)

The table presents a five-year analysis (FY 2020/21 to 2024/25) of WASH (Water, Sanitation, and Hygiene) financing in Makueni County, focusing on contributions from county budgets, development partners, total resource requirements, and the resulting funding gaps. During this period, the county's budget allocations declined from KES 1,125.36 million in 2020/21 to KES 638.44 million in 2024/25, while partner contributions varied, peaking at KES 422.44 million in 2024/25. Despite these contributions, the total budget consistently fell short of the resource requirements outlined in CIDP II and III, which increased significantly from KES 2.5 billion to KES 7.22 billion over the same timeframe.

This imbalance resulted in a growing funding gap, which escalated from KES 864.43 million in 2020/21 to KES 5.87 billion in 2024/25. Consequently, the gap percentage widened from 35% to 81%, indicating a deteriorating capacity to meet WASH service and infrastructure needs. The data reveals two key trends: first, while external support from partners has been crucial, it has not increased proportionally to the needs; second, the significant rise in resource requirements—likely driven by population growth, climate challenges, and infrastructure demands—has not been matched by equivalent increases in financing.

Makueni County faces a widening WASH financing deficit, threatening the sustainability and expansion of water and sanitation services. Addressing this issue will require diversified funding sources including

national transfers and private sector participation along with improved capital absorption and project execution to bridge the growing gap.

The table below shows the Water, Sanitation, and Hygiene (WASH) sector budget in Makueni County over the years 2020 to 2024, and how it compares to the County Gross Product (GCP).

Year	Sector Budget	County Gross Product (KES)	Budget as % of GCP
2020	1,403,362,556.45	110,206,000,000.00	1.27%
2021	1,448,914,608.33	123,611,000,000.00	1.17%
2022	1,050,358,310.44	120,538,000,000.00	0.87%
2023	1,180,289,357.64	151,094,000,000.00	0.78%
2024	1,060,877,394.00	-	-

Figure 16:Water, Sanitation, and Hygiene (WASH) sector budget in Makueni County compared with Gross County Product (GCP)

Over the years, although WASH sector allocations have fluctuated, their proportion relative to the county's economic output has steadily declined from 1.27% in 2020 to 0.78% in 2023. This trend suggests a shrinking fiscal priority for the sector despite increasing needs, signaling a potential mismatch between economic growth and investments in WASH critical infrastructure and services.

Analysis of the county's water sector debt

Water service providers (WSPs) and community-managed schemes in Makueni County face limited access to debt financing due to several structural and financial constraints. These constraints include: Low creditworthiness, which restricts their ability to attract commercial or institutional lending; Weak cost recovery mechanisms, often resulting from low tariffs, poor billing systems, or inefficiencies in service delivery; Lack of formalized loan repayment structures, making it difficult to structure and secure financing agreements.

Currently, there are no formal debt financing facilities available to WSPs within the county, further limiting their capacity to invest in infrastructure or expand service coverage. To address these gaps and enhance financial sustainability, future sector reforms will explore innovative financing models, such as: Blended finance approaches, which combine grants with concessional or commercial loans to reduce financial risk and attract private investment; Output-Based Aid (OBA) models, linking the disbursement of funds to the achievement of measurable service delivery results; Interest-subsidized microloans, specifically targeting household-level sanitation improvements to boost the uptake and affordability of basic sanitation services.

These strategies will unlock new sources of capital for WASH interventions, strengthen the financial viability of service providers, and accelerate progress toward universal access.

Adequacy of county funding for the NAWASIP Program Expenditure Framework (PEF) projects for the period up to 2030.

NAWASIP estimates that achieving universal WASH by 2030 will requires 742 billion shillings nationally, with counties expected to contribute 134 billion shillings from 2019 to 2030. The plan outlines that programs and projects worth 19.22 billion shillings for water, sanitation and hygiene need to be

implemented during this period in Makueni County. To attain universal WASH access, the county must invest approximately 3.2 billion shillings annually over the next six years.

Currently, the investment for WASH in this financial year (24/25) is 600 million shillings, resulting in a funding gap of 2.6 billion shillings. This annual shortfall, underscores the urgent need to increase allocations from own-source revenue to WASH. Additionally, there is a need to leverage public-private partnerships (PPPs), and national climate finance flows, while prioritizing high-impact projects that align with NAWASIP's Performance Enhancement Framework (PEF) and performance-based funding triggers.

3.2.2 Revenue generation models, including tariffs and user fees

Existing Pricing Structures and Their Effectiveness.

The county WSPs core revenue generation model is based on consumer billings for metered water services and other income streams such as new connections, meter reconnections, penalties and Decentralized Treatment Facility currently available only for KIBMAWASCO. However, the utilities continue to experience persistent operational deficits, primarily due to high electricity costs, aging distribution networks and low revenue collection efficiency linked to high Non-Revenue Water (NRW), currently the county is at an average of 38% (WASREB Impact Report No. 16-2024).

The community managed water schemes model is only based on consumer billings for metered and non-metered connections which are charged at a flat rate.

Tariff Effectiveness and Cost Recovery

The existing pricing structures in the county are billings through unstructured tariff structures which makes then ineffective to meet the operational costs. KIBMAWASCO currently doesn't have an approved tariff structure and utilizes an initially WASREB approved expired tariff, MBONWASCO and WOWASCO have been using non cost recovery tariff structures but are in the process of tariff application as required by WASREB.

The community managed water schemes and informal vendors charge at either a flat-rate or metered connection which varies per scheme and locality. These structure lacks alignment to WASREB tariff regulations especially pro-poor considerations, it has low transparency and lacks accountability.

Challenges in affordability and willingness to pay.

Affordability and willingness to pay for water and sanitation services in Makueni County are significant challenges influenced by a complex interplay of socio-economic, environmental, and service-related factors. The key challenges in affordability and willingness to pay in the county include:

a) **High Poverty Levels:** This directly impacts their ability to afford regular payments for water and sanitation services, even at relatively low tariffs. Households with limited incomes often prioritize basic needs like food and healthcare, potentially leaving less for water and sanitation

b) **Climate-Sensitive Livelihoods:** Many livelihoods in the county depend on rain-fed agriculture, making incomes vulnerable to drought and unreliable rainfall. This leads to periods of financial hardship, further reducing the affordability of essential services like water and sanitation.

c) **Trust in Service Providers:** Low trust in the management and financial accountability of water service providers negatively affect willingness to pay. If residents believe that their payments are not being used effectively or are lost to inefficiencies or corruption, they resist paying.

d) **Initial Connection Costs:** Even if monthly tariffs are deemed affordable, the initial cost of household water connections or constructing improved sanitation facilities is a significant barrier for low-income households, hindering their willingness to invest.

e) **Free Water Points/ Sources:** The presence of free public water points and sources, while essential for those who cannot afford connections, sometimes reduces the willingness of those who can afford to pay, especially if the free sources are perceived as adequate.

Strategic intervention will include, expansion of water and sanitation access coverage through water extension; ensuring the WSPs have pro-poor policies in place to protect low income households; promotion and adoption of digital billing and non-cash payment systems like automated kiosks and Mpesa for both urban and rural water schemes to improve collection efficiency; alignment of tariff systems to WASREB regulations and undertake consumer awareness forums.

3.2.3 Challenges in financial sustainability and cost recovery for water and sanitation services

Financial sustainability in the county WSPs and community managed schemes has persistently been constrained due to high operational costs especially grid powered systems and cost recovery has been extensively elusive from tariffs. These challenges have resulted in over reliance on county subsidies and donor assistance. Financial sustainability and cost recovery is further aggravated by:

Economic factors such as high poverty levels and dependency of rain-fed agriculture makes it challenging for many households to afford regular water and sanitation tariffs. The vulnerability of livelihoods dependency to rainfall patterns impacts households' ability and willingness to pay for water and sanitation services during dry periods or after poor harvests.

Governance and Management, despite enhanced efforts to improving governance structures for water and sanitation management in the county, it still remains one of the biggest challenge. There is a need for continuous capacity building for water management committees and Water Service Providers (WSPs) in Makueni to enhance their technical, financial management, and operational efficiency. The County has recognized this and has been undertaking initiatives to enhance transparency and integrity in the water sector through strategies like Integrated Management Toolbox.

Non-Revenue Water, Losses due to leaks, illegal connections, and metering inaccuracies has had significant drain on the financial resources of WSPs in Makueni. Addressing this is crucial for improving cost recovery.

Other challenges include, difficulties in setting and implementing cost-reflective tariffs while ensuring affordability; political interference in service provision and the management of water utilities and schemes; high operational costs related to energy, aging infrastructure, and inefficiencies; and weak regulatory enforcement and institutional coordination.

Strategies for improving revenue collection.

Addressing challenges in the sector management, it requires a multi-faceted approach targeting improved revenue collection. This would involve:

1) **Cost-Reflective Tariffs,** implementing tariff structures that gradually move towards full cost recovery while incorporating mechanisms to ensure affordability for the poor, such as targeted subsidies.
2) **Improving Efficiency,** to be achieved by reducing non-revenue water through infrastructure upgrades, leak detection and repair programs and addressing illegal connections. Enhancing operational efficiency through better management practices, technology adoption of innovation such as automated water kiosks, smart meters, pipe locators and sensors among other technologies and capacity building.
3) **Strengthening Governance and Regulation,** implementing institutional reforms programmes, ensuring the autonomy and professional management of water service providers, enforcing regulations effectively and promoting transparency and accountability.
4) **Strengthening Community Engagement,** involving communities in the planning and management of water and sanitation services to enhance ownership, willingness to pay, and revenue collection.
5) **Climate Resilience,** investing in infrastructure and management practices that enhance the resilience of water and sanitation systems to climate change impacts.
6) **Working with development partners** to increase access to safe water and improve sanitation and hygiene practices.
7) **Offering diverse payment options,** it simplifies the billing process for customers and increases the likelihood of timely payments. This includes online platforms, mobile payment systems, bank transfers and payment through authorized agents. These options will cater to different customer preferences and accessibility, making it easier for them to settle their bills promptly.
8) **Clear and transparent billing statements,** ensuring that billing invoices are easy to understand, outlining consumption details, charges, and payment deadlines explicitly.
9) **Establishment of debt management unit,** to address outstanding debts especially in WSPs and also incentive programs, such as discounts or rewards for early or consistent bill payments, to encourage customers to settle their dues promptly.
10) **Clustering of schemes,** especially small scale rural schemes. This will improve services and attain economy of scales.

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

4.1 Sector Historic Expenditure Patterns

4.1.1 Analysis of past funding allocations and expenditures in water and sanitation

Figure 17 presents a three-year summary (2022–2024) of county specific budget estimates and actual expenditures for water supply and non-sewered sanitation in Makueni County, categorized into capital and operational spending.

Millions (000,000)

Year		2022/23		2023/24		2024/25	
Component	**Expenditure**	**Budget**	**Expenditure**	**Budget**	**Expenditure**	**Budget**	**Expenditure**
Water supply	Capital	543.42	333.08	627.00	449.97	528.59	-
	Operational	129.94	126.94	111.49	89.01	109.85	-
Non-sewered sanitation	Capital	84.31	64.10	116.83	115.78	112.49	-
	Operational	21.69	21.69	13.97	11.75	10.68	-
Total		**779.36**	**545.81**	**869.29**	**666.51**	**638.44**	**-**

Figure 17: Analysis of past funding allocations and expenditures in water and sanitation

-

Between 2022 and 2023, Makueni County faced consistent underutilization of its water and sanitation budgets, particularly in capital investments. In 2022, only 70% of the allocated KES 779.36 million was spent, with capital expenditure on water supply executing at just 61%. In contrast, operational spending for non-sewered sanitation performed well, reaching full utilization. In 2023, the total budget increased to KES 869.29 million, with the execution rate improving slightly to 77%. Capital expenditure for water rose to 72%, while operational spending remained strong, with execution rates of 80% for water and 84% for sanitation. Remarkably, capital spending on sanitation achieved a 99% execution rate, highlighting greater efficiency in that segment.

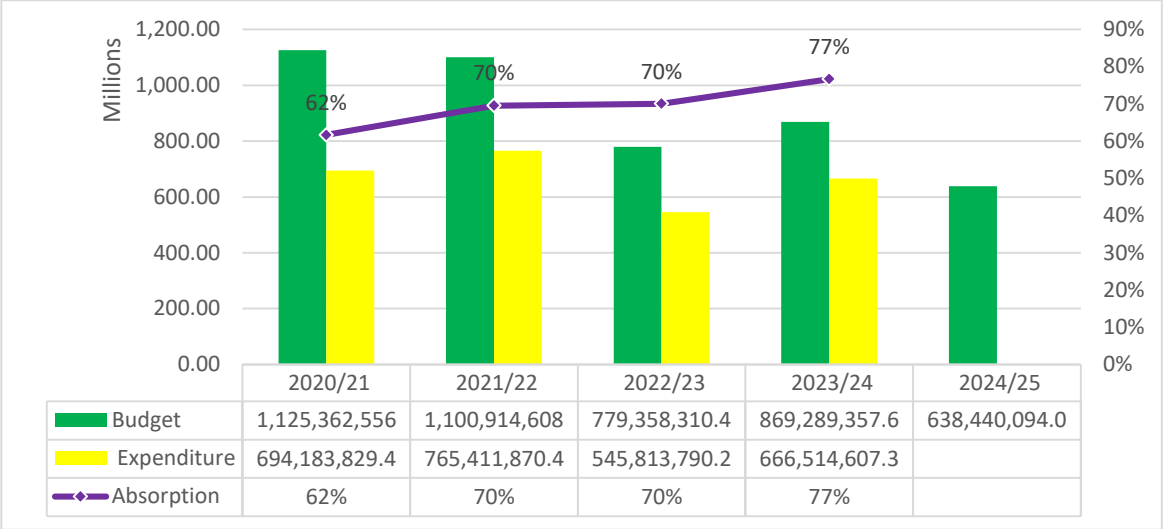
Overall, Makueni County has demonstrated stronger performance in operational spending compared to capital projects, underscoring persistent challenges in infrastructure implementation. Improving capital absorption, particularly in the water supply sector, is crucial for achieving long-term water and sanitation development objectives. Addressing these challenges will require enhancing project planning, procurement, and implementation capacity.

Comparison of Budgeted Vs. Actual Expenditures.

According to the county budget and expenditure reports, the wash sector has experienced fluctuations in both budget allocation and actual expenditure over the 5-year period. While the annual budget peaked in FY 2020/21 at approximately KSh 1.2 billion, it declined in FY 2022/23 onwards. Actual expenditure followed a similar trend but remained consistently lower than the allocated budget across all years, indicating a persistent underutilization of allocated funds.

Despite these disparities, the sector has demonstrated significant improvement in budget absorption. The absorption rate rose from 62% in FY 2020/21 to 77% in FY 2023/24, reflecting enhanced efficiency

in the utilization of available resources. The steady increase in absorption over time suggests better planning, implementation capacity, and financial discipline within the sector. Overall, while challenges in fully executing allocated budgets remain, the upward trend in absorption points to encouraging progress in optimizing the use of available financing.



	2020/21	2021/22	2022/23	2023/24	2024/25
Budget	1,125,362,556	1,100,914,608	779,358,310.4	869,289,357.6	638,440,094.0
Expenditure	694,183,829.4	765,411,870.4	545,813,790.2	666,514,607.3	
Absorption	62%	70%	70%	77%	

Figure 18:Wash Sector Expenditure

4.1.2 Assessment of efficiency in resource Utilization

Makueni County faces significant challenges in effectively utilizing its budget for water, sanitation, and hygiene programs. These challenges stem from limited own-source revenue, weak law enforcement, and heavy reliance on donor funding. Additionally, poor governance, a lack of awareness about water management techniques, vandalism of water and sanitation infrastructure, and inadequate capacity for developing and managing water resources hinder budget absorption. Delays in project implementation, inefficiencies in resource allocation, and insufficient capacity to manage projects effectively have resulted in low efficiency in resource utilization. Moreover, pending bills from previous fiscal years have adversely affected the absorption of the current budget.

The inability to meet own-source revenue targets, due to insufficient data, weak enforcement, and inadequate legal frameworks, results in an over-reliance on transfers from the National Treasury. This dependence restricts financial independence and limits the allocation of sufficient funds to critical water, sanitation, and hygiene projects. Additionally, limited awareness and understanding of water harvesting and storage techniques further impede the efficient use of water resources. Ineffective governance and management of existing infrastructure lead to wastage and a reduced water supply. There is an urgent need to enhance capacity building in sustainable water resource management.

4.1.3 Trends in investment compared to service delivery outcomes

Financial investment is essential for improving access to water and sanitation in Makueni County. Infrastructure investments, particularly in water and sanitation projects, are vital for enhancing access to safe water and sanitation facilities, which directly influence public health and economic development. The county's initiatives, **"*Kutwiikany'a Kiw'u*"** and the last-mile water connectivity program, demonstrate

this commitment through substantial investments in water projects and infrastructure development, leading to increased access and reduced distances to water sources.

To enhance access to clean water and sanitation facilities in both rural and urban areas, the county has invested in constructing and rehabilitating water infrastructure, including sand dams, earth dams, boreholes, water tanks, piped water systems, and latrines. These efforts have resulted in a significant increase in the proportion of households with access to potable water, rising from 35.6% in 2013 to 44.2% in 2019, underscoring the positive impact of these investments. Furthermore, the average distance to the nearest water source has decreased from 8 km in 2013 to 4 km in 2024, enhancing both health and productivity. Investments in sanitation facilities, such as latrines and wastewater treatment plants, also help prevent the spread of waterborne diseases. Improved access to water and sanitation increases productivity by allowing individuals to spend less time collecting water and more time on income-generating activities. Additionally, better sanitation reduces healthcare costs related to waterborne diseases, freeing up resources for other essential services.

Impact Assessment of Previous Funding Initiatives

The water and sanitation sector has received over KSh 8 Billion in financial investment over the last six years. This sustained funding has played a critical role in expanding access to clean and safe water, improving sanitation infrastructure, and enhancing service delivery across Makueni County. Access to improved water and sanitation services in Makueni County has significantly increased, reflecting the impact of sustained investments in the sector. According to the 2019 Census, 46% of the population had access to improved water sources. By 2022, the Kenya Demographic and Health Survey (KDHS) reported an increase to 61%. Similarly, access to improved sanitation rose was at 67% in 2022. Over the same period, the average distance to water sources reduced to under 2 kilometers. These improvements are attributed to continued investment in water infrastructure, including new water supply systems, expansion of piped networks, and sanitation projects that have collectively enhanced service delivery and improved the quality of life for residents.

4.2. WASH Service Coverage Scenarios, Investments, and Reform Needs

4.2.1 Projections of future service demand based on population growth, urbanization and climate change

The Water, Sanitation, and Hygiene (WASH) sector is significantly influenced by demographic shifts and climate change. The expected changes in demand may include the following;

1) **Urbanization.** Makueni County is experiencing urbanization, with towns like Wote and Makindu expanding rapidly. The urban population is expected to grow from approximately 20% to 40% of the total population by 2030. Urbanization will lead to increased demand for piped water supply, sewage systems, and sanitation facilities. Informal settlements may emerge, where access to WASH services is often inadequate, necessitating targeted interventions. The higher density living conditions require more robust sanitation and waste management systems.
2) **Population Growth**: As of the latest census, Makueni County has a population of approximately 1.1 million people, with projections indicating that this number could rise to around 1.5 million by 2030 and over 2 million by 2050. This population growth will significantly increase the demand

for water supply and sanitation services. For instance, if the average water requirement per person is estimated at 20 liters per day, the county will need to ensure that water supply systems can accommodate an additional 400,000 to 900,000 people over the next few decades.

3) **Climate Change Impacts.** Water Availability in Makueni County is prone to climate variability, including droughts and erratic rainfall patterns. Climate change projections indicate that the region may experience increased frequency and severity of droughts, which will exacerbate water scarcity. Flooding events in Makueni County, which may become more common due to climate change, can overwhelm sanitation systems, leading to contamination of water sources and public health risks. The county will need to invest in climate-resilient infrastructure, such as rainwater harvesting systems and improved drainage for urban areas, to mitigate the impacts of climate change on WASH services.

To effectively address the projected population trends in Makueni County and ensure adequate WASH (Water, Sanitation, and Hygiene) services, a comprehensive assessment of infrastructure needs is essential. As the population is expected to grow significantly in the coming years, the following infrastructure needs should be prioritized:

1. Water Supply Infrastructure

This will involve the expansion of piped water systems by developing new distribution networks to reach underserved urban and rural areas, ensuring that all households have access to safe drinking water. Construction of more water storage tanks and reservoirs will manage supply during peak demand periods while ensuring consistent access. Development of additional sources and rehabilitation and/ or enhancement of existing ones will improve access.

2. Sanitation Infrastructure

Improving sanitation facilities through construction of sewer systems, improved sanitation facilities, including public toilets and household latrines, especially in densely populated urban areas and informal settlements. Installation of septic systems is also key in areas without access to centralized sewer systems, ensuring proper containment and treatment of wastewater. Investment in vacuum trucks and other collection equipment to facilitate the safe and efficient removal of fecal sludge from households.

3. Storm water and Drainage Systems

Urban drainage infrastructure improvement, through construction and upgrading of drainage systems in urban areas to manage storm water effectively, reducing flooding risks and protecting sanitation facilities from inundation. Green infrastructure solutions, such as permeable pavements and rain gardens, to enhance storm water management and improve urban resilience.

4. Wastewater Treatment Facilities

Investments in the construction of centralized wastewater treatment plants for urban areas, as well as decentralized systems for rural communities, to ensure proper treatment of wastewater before discharge. Equally, development of systems for the reuse of treated wastewater for irrigation and other non-potable uses, promoting water conservation and sustainability.

5. Community Engagement and Capacity Building

Enhanced support to community-based committees to manage water supply and sanitation services, ensuring integrity, transparency and accountability to ultimately enhance sustainability.

6. Monitoring and Data Collection

Implementing systems for monitoring the condition and performance of water and sanitation infrastructure, to enable timely maintenance and upgrades, together with vibrant feedback mechanisms for users to report issues and suggest improvements, ensuring that services meet community needs.

Adequacy of existing resources for projected service demand.

Makueni County's existing water, sanitation, and hygiene (WASH) infrastructure is currently under strain and inadequate to meet the rising service demand driven by population growth and urbanization. The county depends on a combination of surface water, groundwater and rainwater harvesting. The current maximum water production capacity is approximately 41,522 cubic meters per day, but this reduces to 33,366 cubic meters per day during dry seasons due to climate-induced variability. The projected water demand in the county is expected to rise from 65,664 m^3/day in 2024 to 75,266 m^3/day by 2030. The deficit is set to reduce from 32,298 m^3/day in 2024 to 20,265 m^3/day by 2030.

The water production gap underscores the systemic inadequacies in current infrastructure and highlights a need for urgent investment in WASH systems. Urbanization is expected to aggravate these challenges; as unplanned settlements grow faster than infrastructure expansion. Additionally, climate change will continue to reduce the reliability of existing sources like earth dams, springs and rivers. A strategic response is needed that includes expanding piped systems, rehabilitating non-functional schemes, developing climate-resilient water supply projects and integrating equitable sanitation services. Targeted support for community-based organizations and inter-county collaboration over shared water resources like River Athi and Mzima Springs is also crucial to improve sustainability and reach underserved populations. Table 38: shows various water sources with their estimated capacities

Table 39:Water Sources With Their Estimated Capacities

Types of water source	Source Type	Capacity (m3/day)
Boreholes	Ground	15,918
Shallow Wells	Ground	1,868
Water Pans/ Dams	Surface	10,662
Springs	Surface	7,644
River Abstractions	Surface	5,430
Total		**41,522**

4.2.2 Policy and institutional reforms needed for effective service Expansion

Key policy changes required to enhance service delivery.

To systematically improve access to WASH services in the county, several policies, regulatory and institutional reforms are necessary. These reforms will aim to enhance governance, improve service delivery and ensure sustainability in the face of growing demand due to population growth, urbanization, and climate change. Here are key areas for reforms:

Governance and Institutional Framework, Development and enforcement of county regulations that govern water quality, sanitation standards and service delivery. This includes reviewing of existing and development of key legislations. Specifically, establishment of a Makueni Rural Water and Sanitation Company to entrench good governance practices in management of rural water schemes.

Integrated Water Resource Management (IWRM), Holistic approach to implementation of IWRM practices that consider the interconnections between water supply, sanitation and environmental sustainability. This would be possible through cross-sectoral collaborations both internally and externally to create synergies and address the multifaceted challenges of WASH service delivery. This has been proven to be a best practice as evidenced by ongoing FLLoCA programme.

Financial Reforms; Establishment of innovative financing models, such as public-private partnerships (PPPs), to mobilize resources for WASH infrastructure development. Additionally, ensuring the WSPs are operating on cost recovery tariff structures and community based schemes have approved tariff structures. This would be through review and adjustment of water pricing and sanitation tariffs to ensure they are affordable while also generating sufficient revenue for maintenance and expansion of services.

Capacity Building and Human Resource Development, Investment in training programs for service providers, and community members to enhance their skills in WASH management, operation, and maintenance. Also, facilitate platforms for knowledge exchange among stakeholders to share best practices, innovations and lessons learned in WASH service delivery.

Community Engagement and Participation; Implementation of public awareness campaigns to continuously promote hygiene practices and the importance of sanitation, encouraging community participation in maintaining WASH facilities.

4.2.3 Investment needs to close service gaps and improve sustainability

To effectively close service gaps and enhance the sustainability of WASH services, an estimated investment of 19.55 billion is required. This figure encompasses a comprehensive range of priorities including infrastructure development, rehabilitation of existing systems, capacity building and technology integration across rural and urban areas. In addition to these identified needs, an estimated KES 0.375 billion is needed specifically to strengthen Legal, Policy and Institutional Frameworks, ensuring that the institutional and regulatory environment supports long-term water security and effective service delivery. The combined investments are essential not only for expanding access and improving reliability, but also for safeguarding water resources and enhancing climate resilience across the sector.

Table 40:Required financial resources for achieving universal access.

S/No	Area	Key Investment Priorities	Est. cost (Billion)
1.	Water Infrastructure Development	i. Construction of dams (large, medium, small) ii. Borehole drilling and rehabilitation iii. Rainwater harvesting systems iv. Smart metering and pipeline automation v. Water treatment and piped network expansion	17.346 Billion
2.	Sanitation and Hygiene Services	i. Infrastructure investments in HCFs and schools ii. Community wide sanitation programmes iii. ODF programmes	1.831 Billion
3.	Legal, Policy and Institutional Frameworks	i. Development/review of 40+ WASH policies and laws ii. Establishment of WASH coordination unit iii. Institutionalizing rural water governance through establishment of Makueni Rural Water and Sanitation Company (MARUWASCO) iv. Formalization and regulation of Water User Associations v. Frameworks for PPPs and climate-smart water infrastructure	0.375 Billion
Total			**19.552 Billion**

Required Financial Resources for Achieving Universal Access.

To achieve universal access to water supply and services in the county, an estimated KES 17.31 billion is required. This investment will focus on expanding and upgrading infrastructure to address the county's significant water deficit. Priority actions include construction of large and medium dams, drilling and equipping of boreholes, expansion of piped water networks and promotion of rainwater harvesting systems across schools, health centers and households. Additionally, smart metering and leakage detection technologies will be deployed to reduce non-revenue water, currently at an average of 38%. These interventions aim to increase water coverage from the current 46% at least basic to 100% and reduce average distance to a reliable water source from 5 km to 2 km, ensuring equitable and climate-resilient water access for all residents.

Sewered sanitation has been prioritized in the urban areas and specifically, the county headquarters Wote town at an estimated cost of KES 750 million. Non sewered sanitation by construction of Decentralized Treatment Facilities in key major semi-urban and rural towns has been earmarked at a cost of KES 37 million.

Priority sustainable and climate-resilient investments (infrastructure and reforms) to address existing service gaps:

To address existing water and sanitation service gaps and build resilience to increasing climate variability, Makueni county has identified a suite of priority investments. These investments aim to expand coverage, improve service reliability, reduce vulnerability to droughts and floods and ensure long-term sustainability of WASH systems. The approach integrates infrastructure development with institutional and policy reforms, focusing on water harvesting and storage, smart technologies, decentralized sanitation solutions, and strengthened governance. These interventions will contribute toward achieving universal WASH access while promoting equity, efficiency, and climate adaptation.

Table 41:Priority Sustainable and Climate-Resilient Investments

Category	Investment Area	Key Activities
Water Supply Infrastructure	Dams and Water Storage Systems Rainwater Harvesting Systems	Construction of large, medium and small dams; rehabilitate existing water pans and reservoirs Provide tanks for schools, health facilities, and households; roof and surface runoff harvesting
	Boreholes and Groundwater Recharge	Drilling, equipping and distribution of solarized boreholes and implementation of managed aquifer recharge schemes
	Smart Technologies and Water Efficiency	Installation of smart meters; automation of pipeline networks; introduction of leakage detection and reduction of non-revenue water
Institutional Reforms	Governance and Coordination	Establishment of WASH coordination unit which will integrate WASH into planning and budgeting processes
	Legal, Policy and Institutional Frameworks	Development /review of over 40 policies and legal tools including PPP, gender equity and water quality standards
	Capacity Building	Train Water User Associations (WUAs), CBOs, WSPs and county staff on service delivery and climate-smart planning

5.0. SECTOR INVESTMENT PLAN, INSTITUTIONAL REFORMS, AND FINANCING STRATEGY

5.1 Strategic Objectives for the Sector

5.1.1 Vision and key priorities for water, sanitation, and hygiene services

Kenya Vision 2030

Kenya Vision 2030 is the long-term development blueprint for the country and is motivated by a collective aspiration for a better society by the year 2030. The aim of Kenya Vision 2030 is to create "a globally competitive and prosperous country with a high quality of life by 2030". It aims to transform Kenya into "a newly-industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment".

The Kenya Vision 2030 was to be implemented through three pillars;

a) Economic and Macro (moving up the economic value chain),
b) Social (investing in the People of Kenya) and
c) Political (Moving to the Future as One Nation)

Water and sanitation is described in the Social pillar. Kenya's vision for 2030 is to achieve universal access to water, sanitation, and hygiene (WASH) services. This includes: 100% coverage of safe water supply and 100% access to basic sanitation services.

Makueni County CIDP 2023-2027

The Makueni County Integrated Development Plan 2023-27 is the third generation of the five-year county plans since devolution. The overall vision is to have a prosperous value-based county with a high quality of life. The theme of the plan is 'A resilient economy for sustainable development' and aims to support the development of a resilient community that can withstand shocks and grow its economy. The CIDP is being implemented through eight sectors: Water, Sanitation, Environment and Natural Resources; Agriculture and Rural Development; Transport, Infrastructure, Energy and ICT; Health Services; Social Protection, Education and Recreation; General Economic and Commercial Affairs; Lands and Urban Development; and Devolution.

Over the years, access to water remains a challenge to a large proportion of the Makueni county population. In response, the 2023-2027 plan emphasizes a strategic and collaborative approach to improving water availability for domestic, agricultural, industrial, and urban use. Key strategies include; developing water infrastructure to harvest and distribute water, enhancing the water governance, conservation of water catchment areas and mobilization of more resources to invest in water development.

The overall goal of the Water, Sanitation, Environment, and Natural Resources sector is to ensure sustainable management, development and utilization of natural resources in a clean and secure environment. The specific objectives are: -

1. Provide affordable quality water for household consumption and use in agricultural and industrial activities;

2. Promote sustainability of water resources for enhanced development in water and sanitation infrastructure;
3. Promote natural resources and environment catchment areas restoration, conservation, protection and management for sustainable development, posterity and community resilience;
4. Enhance natural resource management and sustainability for climate change resilience.

The Makueni County Integrated Development plan 2023-2027 sector priorities under Water, Sanitation and Environment are to increase access to water, improve sanitation and waste management, enhance climate change resilience and strengthen policy, legal and institutional framework. These will be achieved through the implementation of the following programmes:

1. **Universal Access to Safe Sanitation**: The county aims to ensure that all residents, whether in rural, peri-urban, or urban areas, have access to safe and sustainable sanitation facilities.
2. **Integrated Water Resource Management**: Through initiatives like the "*Kutwiikany'a Kiw'u*" program, the county seeks to promote holistic water harvesting and management to address challenges such as frequent droughts and degradation of water catchment areas.
3. **Improved Governance and Infrastructure**: Efforts are being made to enhance governance, build capacity, and improve the management of existing water and sanitation infrastructure.
4. **Environmental Protection and Climate Change Adaptation**: The county is committed to mainstreaming climate change considerations into planning and budgeting to ensure sustainable development.
5. **Economic and Social Development**: By addressing water and sanitation challenges, the county aims to reduce health risks, economic losses, and social impacts, contributing to overall development.

These goals align with Kenya's Vision 2030 and the Sustainable Development Goals, ensuring a brighter future for Makueni County residents.

Strategic priorities aligned with county development plans.

Makueni County's strategic priorities for water, sanitation, and hygiene (WASH) are closely aligned with its County Integrated Development Plan (CIDP) 2023-2027. These priorities aim to address critical challenges such as inadequate water access, environmental degradation, and limited sanitation services.

Key focus areas include:

1) **Water Development and Management**: Enhancing access to clean and safe water for households and communities.
2) **Improved Sanitation Services**: Expanding sanitation infrastructure and promoting hygiene practices.
3) **Climate Change Adaptation**: Implementing sustainable practices to mitigate environmental degradation and overexploitation of natural resources.

These efforts are part of a broader vision to create a resilient economy and improve the quality of life for residents

5.1.2 Alignment with Kenya's national water strategy, national financing plan (NAWASIP) and SDG 6 goals

Makueni County's water strategy and investment plan aligns with both national and global goals by addressing critical water challenges and promoting sustainable development. The Kenya National Water and Sanitation Investment and Financing plan 2022-2030 targets 100 percent water coverage for both urban and rural, 100 percent sanitation coverage for rural, 60 percent decentralized and Non Sewage Urban sanitation and 40 percent Urban sewage. Here's how it contributes:

National targets:

- The strategy supports Kenya's Vision 2030, which emphasizes sustainable water resource management and universal access to clean water and sanitation.
- It aligns with the Constitution of Kenya (2010), particularly Article 43, which guarantees the right to water and sanitation.
- The plan integrates with the Makueni County Integrated Development Plan (CIDP) 2018–2022, focusing on water harvesting, storage, and governance.

Global targets:

- The strategy contributes to the United Nations Sustainable Development Goals (SDGs), particularly SDG 6, which aims for universal access to clean water and sanitation.
- By addressing climate change impacts and promoting environmental sustainability, it supports broader global efforts to combat climate change and protect ecosystems.

Makueni's approach, such as the "Kutwiikany'a Kiw'u" initiative for holistic water harvesting and management, demonstrates a commitment to sustainable practices that benefit both local communities and the global agenda

Key commitments under the Sustainable Development Goals (SDGs).

The Sustainable Development Goals (SDGs) emphasize universal access to clean water and sanitation under **Goal 6: Clean Water and Sanitation**. This includes commitments to ensure sustainable water management, improve water quality, and protect water-related ecosystems.

For Makueni County, the water strategy and investment plan align with these global goals. The county's development plans, such as the Annual Development Plan 2023/2024 and the Integrated Development Plan 2023-2027, highlight key priorities:

1. **Infrastructure Development**: Expanding access to clean water and sanitation in both rural and urban areas.
2. **Climate Resilience**: Building systems to mitigate the effects of climate change on water resources.
3. **Community Empowerment**: Strengthening cooperatives and local governance to manage water resources effectively.
4. **Innovation and Technology**: Automating water management systems for efficiency.
5. **Sustainability**: Protecting water catchment areas and promoting sustainable usage.

These efforts are part of a broader vision to enhance community resilience and improve the quality of life for residents.

5.1.3 Cross-sectoral integration, including climate resilience and environmental conservation

Water plays a pivotal role in environmental sustainability, especially in Makueni County, which faces challenges such as frequent droughts and degradation of water catchment areas. Here are some key aspects:

Water Harvesting and Management: Makueni County has implemented strategies like "*Kutwiikany'a Kiw'u*" (Holistic Water Harvesting and Management) to address water shortages and ensure sustainable use.

Community Participation: Public involvement in planning, managing, and monitoring water projects has significantly improved their sustainability. Engaging local communities ensures that water resources are managed effectively and meet the needs of the population.

Stakeholder Engagement: Collaboration between the county government, NGOs, and beneficiary communities has enhanced the monitoring and evaluation of water projects, ensuring long-term success.

Environmental Protection: Sustainable water management contributes to preserving ecosystems, reducing the impact of climate change, and supporting agriculture and livelihoods

Coordinating the Water, Sanitation, and Hygiene (WASH) sector with other sectors like health, agriculture, environmental management, and climate change is essential for sustainable development and resilient. These sectors can work together as outlined below:

Health: WASH interventions directly impact public health by reducing waterborne diseases and improving hygiene in healthcare facilities. Collaboration ensures clean water access in hospitals and promotes community health education.

Agriculture: Efficient water use and sanitation practices in agriculture can prevent contamination of water sources and improve irrigation systems. This synergy supports food security and sustainable farming.

Environmental Management: Integrating WASH with environmental policies helps in managing waste, protecting water bodies, and promoting eco-friendly sanitation solutions.

Climate Change: Climate-resilient WASH infrastructure can mitigate the impacts of extreme weather events. Collaboration ensures adaptation strategies like water conservation and disaster risk reduction.

Climate adaptation and resilience building measures

Makueni County has been proactive in addressing climate change through various adaptation and resilience-building measures. Here are some key initiatives:

1. **County Climate Change Fund (CCCF)**: Makueni County has established a Climate Change Fund to provide funding for priority climate change actions & interventions identified by communities and other stakeholders. The Fund is allocated at least 2% of the County's development budget with additional funding from development partners, National Climate Change Fund and donations.

2. **Participatory Climate Risk Assessments (PCRA)**: The county engages communities to identify and prioritize climate vulnerabilities and risks. This approach ensures that adaptation measures are tailored to local needs.
3. **Enhanced Climate Information Services (CIS)**: By improving access to climate information, the county empowers communities to make informed decisions about farming, water management, and disaster preparedness.
4. **Makueni County Climate Change Action Plan (2023–2027)**: This comprehensive plan outlines strategies to mitigate climate impacts, protect natural resources, and promote sustainable development.
5. **Partnerships and Funding**: Collaborations with organizations like UKAID, Christian Aid, and the Adaptation Consortium have brought significant resources and expertise to the county's climate initiatives.

These efforts highlight Makueni's commitment to building a sustainable and resilient future

Coordination with other sectors such as health, agriculture, environmental management, and climate change.

Makueni County recognizes that sustainable WASH services cannot stand alone and require strong coordination across different sectors. This cross-sectoral approach ensures that water systems are resilient, environmentally sustainable, and able to meet community needs under climate stress.

Health Sector; The County ensures there are joint programs spearheaded by Health and Water Department on hygiene promotion, disease prevention and surveillance and improving sanitation facilities. There is also continuous water quality monitoring by undertaking regular tests and treatment of water to meet public health standards hence reducing the spread of waterborne diseases. There is also combined health and hygiene campaigns in schools, communities, and markets to promote handwashing, latrine use, and menstrual hygiene which is done in collaboration with Department of trade and Education.

Agriculture Sector; Collaboration with the agriculture sector ensures that water use is integrated across domestic and agricultural needs, helping to balance irrigation demands and household supply, especially in water scarce areas. Through joint promotion of climate-smart agricultural practices such as drip irrigation, mulching, and conservation agriculture the sectors work to reduce the pressure on shared water resources. Further, they cooperate on protecting catchment areas from agricultural runoff, ensuring that pesticides and fertilizers do not contaminate drinking water sources, which could compromise human and ecosystem health.

Coordination with Environmental Management; The County's WASH teams work alongside the Department of Environment and the National Environment Management Authority (NEMA) to protect critical ecosystems, such as watersheds, wetlands, and riparian zones, which are essential for maintaining long-term water availability. Joint afforestation and reforestation initiatives by the County National Government aim to restore degraded landscapes, improve groundwater recharge, prevent soil erosion and mitigate climate change impacts. Environmental legislations are enforced to control pollution from solid waste, waste water and agricultural activities that threaten water sources.

Climate Change and Disaster Risk Management; Integration with the Climate Change Unit (CCU) and Disaster Risk Management Unit (DRMU) sectors ensures that climate risks are factored into WASH planning and infrastructure designs. The County Climate Change Unit collaborates with WASH planners to incorporate climate projections such as increasing droughts or floods into water system designs. Investments are made in resilient infrastructure including sand dams, boreholes and rainwater harvesting systems to reduce the community's vulnerability to water scarcity. Additionally, Makueni County leverages climate finance sources, such as the County Climate Change Fund (CCCF) to support locally prioritized, climate-resilient WASH projects. The sectors also work together on early warning systems and preparedness measures with Kenya Meteorological Department and National Drought Management Authority (NDMA) to ensure that water supply and sanitation services can withstand climate shocks.

Climate adaptation and resilience building measures

Makueni County has adopted several measures to strengthen resilience and adapt WASH services to the impacts of climate change, such as droughts and erratic rainfall through;

a) **Water Resource Management**

i. Construction of sand dams, earth dams, farm ponds and water pans to enhance water storage during dry periods.

ii. Rainwater harvesting in schools, health facilities, and households.

iii. Promotion of groundwater development (boreholes and shallow wells) with solar pumping to reduce dependence on unreliable surface water.

iv. Supply of water tanks to vulnerable groups to cushion them against climate shocks

b) Ecosystem and Catchment Protection

i. The County is spearheading community-led watershed management initiatives to restore degraded catchments and protect springs.

ii. Agroforestry and reforestation programs in upper catchment areas.

iii. Enforcement of riparian land protection to prevent erosion and siltation of water sources.

iv. Rehabilitation of degraded areas and awareness creation on best Sustainable Land Management Practices

v. Implementation of urban greening programs in towns and markets within the County

c) Infrastructure Climate-Proofing and Green energy

vi. Designing water systems to withstand climate stresses, such as elevated tanks resistant to flooding and using materials that can endure extreme heat.

vii. Use of solar energy in pumping water to storage tanks to embrace green energy

viii. Diversification of water sources to reduce reliance on a single supply, making the system more robust to drought.

d) Community Engagement and Capacity Building

i. Training water user associations (WUAs) on climate risks, water conservation, and early warning systems.

ii. Incorporating local knowledge into water management plans, ensuring culturally appropriate and locally led solutions.

iii. Training sustainability committees to ensure proper water governance

iv. Being vigilant and champion for protection of water infrastructure to curb vandalism

e) Policy and Financing Mechanisms

i. Utilizing the County Climate Change Fund (CCCF) which is allocated 2% of the development budget and funding from other partners to finance community-prioritized WASH projects.

ii. Mainstreaming climate change considerations into County development and investment plan.

iii. Fast-tracking enactment of relevant policies and legal frameworks for improved governance of WASH infrastructure

5.2 Water Supply Infrastructure Investment Plan

5.2.1 Planned projects for new water supply systems and rehabilitation of existing ones

To meet the growing water needs and improve service delivery, Makueni County has prioritized an ambitious portfolio of water supply infrastructure projects between 2025 and 2030. These projects target both the construction of new systems and the rehabilitation or expansion of existing facilities, with a focus on solar-powered systems, water treatment, storage and distribution networks.

Key interventions include drilling and equipping boreholes, expanding and treating existing earth dams, automating water kiosks and installing smart metering technology to reduce non-revenue water. The estimated total investment for these interventions is approximately KES 17.346 billion, with implementation timelines phased annually based on urgency, population served and technical feasibility. A summary of priority projects is presented in the table 41 below, while the full list is annexed to this document.

Table 42: Summary Of Priority Projects

Infrastructure Type	Approx. Share (%)	Estimated Cost (KES Billion)
Mega/Multipurpose Dams	63.4%	11.00
Pipelines & Distribution Networks	10.3%	1.78
Boreholes (drilling, equipping, solarization)	7.7%	1.21
Water Treatment & Reticulation	6.8%	1.18
Earth/ Sand Dams (expansion, treatment, distribution)	5.2%	0.93
Storage Tanks, Sumps & Reservoirs	4.3%	0.74
Smart Metering & Automation	2.3%	0.39
Total	**100%**	**17.35**

5.2.2 Consideration of MUS/WASH+ approaches in design and implementation

Makueni County's water investment plan integrates Multiple-Use Water Services (MUS) and WASH+ approaches to ensure that water infrastructure addresses not only domestic needs but also supports livelihoods such as irrigation, livestock watering and sanitation. This integrated planning recognizes the diverse ways communities rely on water and enhances resilience by designing systems that serve multiple functions.

Several projects including all dams are structured as climate-resilient, solar-powered systems with provisions for treatment, storage and distribution for varied uses. These designs incorporate local water use patterns, promote gender inclusion and align with WASH+ principles to improve health, sustainability and economic benefits across the county.

In addition to water supply, the investment plan places strong emphasis on the inclusion of hygiene and sanitation components within water projects to enhance public health outcomes and maximize the impact of WASH interventions. Projects such as the Kunda Kindu Decentralized Treatment Facility (DTF) and the Rural Urban Sanitation and Hygiene (RUSH) Program reflect deliberate integration of sanitation infrastructure, behavior change promotion and safe waste management alongside water provision. These components are critical in preventing waterborne diseases, reducing environmental contamination and promoting dignity specifically for women and school-going children. Future projects are designed with designated sanitation blocks, latrines, handwashing facilities and hygiene education campaigns to ensure a holistic WASH+ approach across both rural and urban settings.

The investment portfolio for Makueni County comprises a diverse range of water infrastructure projects valued at KES 19.55 Billion, strategically distributed across sub-counties. These include drilling and equipping of boreholes, expansion of dams, water treatment facilities and installation of solar-powered pumping systems. Each project is tailored to meet both domestic and productive water needs, with a strong emphasis on reaching underserved rural populations. The financial allocations vary depending on the project scale; from small community boreholes to large-scale multipurpose dams. In addition to improved water access, the projects generate substantial social impact by reducing water collection time, promoting hygiene and enabling economic activities such as irrigation and livestock farming. A detailed list of all specific investments, their estimated costs, target beneficiaries, and scope is annexed.

In planning and implementation, environmental and social safeguards have been embedded to ensure that infrastructure is not only effective but also sustainable. Risk mitigation strategies include solarization to reduce energy dependency, treatment facilities to ensure water quality, and sedimentation control for dams. Climate resilience is reinforced through investments in multi-use systems that serve both domestic and livelihood needs, ensuring water security during drought periods. All large-scale projects are subjected to Environmental Impact Assessments (EIAs), and community participation is integrated to manage potential social risks such as land use conflicts or displacement. Furthermore, regulatory compliance is enforced through NEMA licensing, WRA permits and periodic monitoring, ensuring that infrastructure development aligns with both national guidelines and community interests.

5.3 Sanitation and Hygiene Services Investment Plan

5.3.1 Priority sanitation projects, including non-sewered sanitation and fecal sludge management

The county is planning to train local artisans on modern sanitation technologies including, installation of SATO PANS, SAFI Latrines and use of *Makenga* Technologies.

Sanitation marketing through organized groups e.g. community health promoters in subsidized costs is in use in some community health units. This phenomenon has shown a positive trend in climbing the sanitation ladder. Social behavior change communication within the triggered and ODF villages is paramount in the sanitation value chain.

The county is shifting from Community Led Total Sanitation protocol to Rural and Urban sanitation protocol which classifies sanitation into grades that is, grade zero (open defecation) grade one (open defecation free) grade two (safe and sustainable sanitation) and grade three which is clean and healthy. Makueni County is mostly at grade one which is ODF thus need for concerted to climb the sanitation ladder to grade 3 which is clean and healthy environment and to achieve the above the county is undertaking the following: -

1. Carrying out pre triggering, triggering, follow up, verification, certification, celebrations and post ODF activities.
2. Training of health care workers (PHOs, CHAs and Community Health Promoters) on CLTS and Rush protocols
3. Training local artisans on upcoming sanitation technologies (SATO, makinga, Safi, overlap technology etc)
4. CHAST training in schools
5. Hygiene promotion through mounting of tippy tap with running water and soap
6. Advising on sanitary facilities designs in schools and other public institutions to cater for upcoming gender needs
7. Improving Sanitation and Hygiene services in health facilities across the Country through provision of separate sanitation doors for each gender and provision of adequate handwashing facilities with running water and soap
8. Advocating for the construction of improved latrines that are safe, hygienic, and environmentally friendly, particularly in areas lacking sewer connections.
9. Encourage the use of properly designed septic tanks that can effectively treat wastewater on-site, reducing the burden on centralized systems.
10. Investing in vacuum trucks for efficient collection of fecal sludge from onsite sanitation facilities, ensuring timely and safe transport to treatment facilities
11. Developing decentralized treatment facilities that can process fecal sludge locally, reducing transportation costs and environmental impact.
12. Implementing composting and biogas systems that convert fecal sludge into valuable resources, such as organic fertilizer and renewable energy.
13. Implementation of guidelines and regulations for the design, construction, and maintenance of sanitation systems.

14. Establish a system to collect and analyse data on sanitation coverage (WASH HUB) to inform policy and investment decisions.

Investment in Climate-Resilient and Sustainable Fecal Waste Management.

Investments in climate-resilient and sustainable faecal waste management is gaining momentum, with initiatives focusing on innovative sanitation solutions and funding opportunities. Key developments include the Green Climate Fund's new guidelines for climate-resilient sanitation projects and the establishment of investment frameworks aimed at enhancing urban resilience and waste management practices. Innovative Sanitation Solutions such as:

a) Decentralized Systems: Investment in decentralized sanitation systems that can adapt to climate impacts, ensuring that communities have access to safe waste management even in extreme weather conditions.
b) Eco-Friendly Technologies: Development of eco-friendly technologies such as biogas digesters and composting toilets that convert waste into energy and fertilizers, promoting sustainability.

5.3.2 Behavioral change and market-based sanitation initiatives

Strategies for promoting improved sanitation practices.

The county has embraced both CLTS and RUSH protocols to improve sanitation through PHOs, CHAs and CHPs which calls for social behavior change communication. The county government in collaboration with partners has empowered some community health units to stock subsidized sanitation products (ONE STOP SANITATION CENTRE).

Strategies for promoting private sector participation in sanitation service.

Promoting private sector participation in sanitation services can significantly enhance efficiency, innovation, and investment. The County will embrace public-private partnerships and establish clear roles and responsibilities for both public and private entities, advocate for financial incentives or subsidies from private companies for community members to invest in sanitation infrastructure, offer training for private companies on best practices in sanitation management and technology, and provide technical support to help private firms develop and implement sanitation projects. The county will ensure stakeholder engagement, involving community stakeholders in discussions to build trust and support for private participation, and also perform market research to identify opportunities and challenges for private sector involvement.

5.3.3 WASH investments for schools and healthcare Facilities

The Department of Health Services aims at Carrying out various activities in WASH investment plan. This includes construction of Health facility toilets at Seven health facilities at a cost of KSH 7,000,000. Twenty-five schools need hygiene and sanitation facilities at a cost of KSH 18,000,000. Hygiene and sanitation survey to be done in 249,669 households at a cost of KSH 11,379,000. Capacity building of 130 PHOs and CHAs on Community led total sanitation at a Cost of KSH 10,080,000. Sensitization of

Community Health Promoters on WASH at a cost of 11,379,000. Continuous monitoring of Hygiene and sanitation in 993 schools at a cost of KSH 25,000,000 and monitoring of 242 Health facilities at KES 7,000,000. Conversely incentives to be given to 225,045 of the needy households at a cost of KSH 18,965,000, The County aims at training 80 PHOS on RUSH protocol at a cost of KSH 1,123,400. The Hygiene and Sanitation investment plan precisely illustrates how Hygiene and Sanitation activities will be carried up to the year 2030.

5.3.4 Project List, cost estimates, and risk mitigation Strategies

The table below summarises the project categories, costs and risk mitigation strategies. A detailed list has been annexed under, Annex 1 and 2.

Table 43: Project types, Associated Risks and The Mitigation Measures

Infrastructure Type	Estimated Cost (Billion)	Associated Risks	Risk mitigation measures
Boreholes (drilling, equipping, solarization)	1.21	Over-abstraction of groundwater	Regulation of abstraction with WRA permits and install flow meters
		Poor water quality (e.g., fluoride, salinity)	Installation treatment systems as needed
		Inaccurate siting / dry boreholes	Carrying out detailed hydrogeological surveys prior to drilling
		Equipment failure or vandalism	Use quality components, train local operators, and provide fencing/security
		Community conflicts over access/ownership	Establishment of Water User Associations (WUAs) and involve communities in planning
Earth/ Sand Dams (expansion, treatment, distribution)	12.05	Siltation reducing storage capacity	Construction of silt traps upstream and implementation of catchment protection
		Breach or structural failure	Carrying out of proper engineering design; regular inspection and maintenance
		Contamination of water sources	Fence off dam areas; provide separate water access points for livestock and people
		Conflicts over water access and control	Formation and strengthening of Water Users Associations (WUAs)

Infrastructure Type	Estimated Cost (Billion)	Associated Risks	Risk mitigation measures
Water Treatment, Reticulation Storage Tanks, Sumps, Reservoirs Pipelines & Distribution Networks and Smart Metering & Automation	4.09	Leakages and pipe bursts	Use durable materials; conduct regular inspections and prompt repairs
		High Non-Revenue Water (NRW) due to illegal connections	Installation of smart meters and bulk meters; establishment of DMAs and enforce billing controls
		Vandalism and theft of pipes or fittings	Securing installations; community engagement in safeguarding infrastructure
		Land disputes along pipeline routes	Carrying out of stakeholder consultations and acquisition of land agreements before installation
		High operational costs	Use of Use energy-efficient systems like solar and automation of chemical dosing
		Technical failure of smart meters or ATMs	Use tested, quality-certified technology; establish routine maintenance schedules
Total	**17.35**		

5.3.5 Environmental and Social Impact Considerations

In Makueni County, environmental and social impact considerations in WASH (Water, Sanitation, and Hygiene) are guided by Kenya's legal framework, including the Constitution of Kenya Articles 27, 42 and 43, the Environmental Management and Coordination Act (EMCA) 1999 Revised 2015, the Water Act, and the Makueni County Gender Policy 2021. Environmental impacts focus on sustainable water use, preventing pollution, and ensuring climate-resilient infrastructure in the County. Social impacts address community health, equitable access, time burdens on women and girls, and protection from risks like gender-based violence when accessing water and sanitation facilities. Gender sensitivity is critical, requiring inclusive planning, safe and accessible WASH infrastructure including menstrual hygiene management, and the meaningful participation of women and marginalized groups in decision-making. The Makueni County Gender Policy, 2021 specifically calls for gender mainstreaming in all sectors ensuring that WASH projects prioritize women's needs, protect vulnerable populations, and promote equality in governance structures. Together, these frameworks ensure WASH services in Makueni are sustainable, equitable, and responsive to both environmental and social challenges.

Some measures implemented in Makueni County include:

1) Prioritizing water access points near homes and schools to reduce the time burden and safety risks for women and girls.

2) Establishing gender-segregated sanitation facilities in schools, health centers, and public spaces to uphold privacy and dignity.
3) Supporting menstrual hygiene management programs, including the distribution of dignity kits to schoolgirls.
4) Creating economic opportunities for women in water user associations and WASH entrepreneurship e.g. in water kiosks and supply chains.
5) Building the capacity of local institutions to mainstream gender in WASH planning, budgeting, monitoring, and evaluation.

5.4 Water Resources Management and Catchment Conservation Investment Plan

5.4.1 Planned investments in watershed protection, groundwater recharge, and pollution Control

Makueni County has undertaken several targeted investments to enhance the management of its water resources, focusing on catchment and sub-catchment conservation. The initiatives aim to improve water availability, promote sustainable land use, and build resilience against climate change.

i. Restoration of Kiu, Kiboko, Mang'elete, Kithue catchments which were degraded. Other catchments have been prioritized for restoration among them Kwakyai springs
i. Construction of sand dams which are mostly installed with sumps, solar power for pumping and storage tanks to support water distribution
ii. Landscape restoration initiatives among them the Nzaui-Makuli landscape with partnership of World Resource Institute (WRI).
iii. Under the '*Kutwiikanya Kiwu*' program, the County has constructed numerous sand and earth dams to enhance water storage. These structures capture seasonal river flows, recharge groundwater, and provide water for domestic and agricultural use.
iv. Community environmental awareness and advocacy programs
v. Mapping out riparian land across major rivers in the County
vi. Enactment of Water Act, 2020, Climate Change Act, 2022 and establishing relevant governance structures like Sustainability Committees in governance of water infrastructure
vii. Rock catchment initiatives where a concrete wall is constructed along and water harvested to storage tanks for distribution; Masue Rock catchment in Mbitini ward
viii. Roads for water programme; This initiative has seen community members diverting road run-off to their farms through excavation of trenches and cut off drains. The programme has not only build climate resilience by improving food security but has also made the roads less vulnerable.
ix. Priority projects for sustainable water resource management with consideration of climate change impacts and social vulnerabilities.

Priority projects for sustainable water resource management with consideration of climate change impacts and social vulnerabilities.

Makueni County has prioritized several key projects to ensure sustainable water resource management while addressing climate change impacts and the vulnerabilities of its local populations. This is through the development and enhancement of water harvesting and storage infrastructure, including the

construction of large-scale earth dams, sand dams, water pans, and household-level roof catchment systems, all designed to mitigate the increasing water scarcity driven by prolonged droughts and erratic rainfall patterns. Additionally, the County emphasizes the protection and rehabilitation of water catchment areas and riparian zones to safeguard water sources from degradation, erosion, and pollution.

Integrated waste management systems and the establishment of water treatment facilities are also prioritized to ensure availability of quality water for domestic use reducing health risks associated with waterborne diseases. Further, Makueni County seeks to promote climate-smart agricultural practices such as conservation agriculture, regenerative farming, and the use of drought-resistant crops to reduce water demand in the farming sector.

Socially, the County's approach incorporates targeted support for vulnerable groups including women, children, people with disabilities (PWDs), the elderly, and the terminally ill by ensuring equitable access to water resources and engaging these groups in participatory planning and decision making processes. These projects are underpinned by the mobilization of adequate financial resources, strengthening of institutional capacity, enhancement of climate information services, and the application of early warning systems, all aimed at building resilience and adaptive capacity across communities.

Conservation initiatives to protect water sources.

The County is implementing several conservation initiatives to protect water sources

i. Afforestation and reforestation programs incorporating agroforestry initiatives
ii. Catchment protection with a focus on wetlands, springs, hills
iii. Restoration of degraded landscapes
iv. Sensitizing community on Sustainable Land Management practices
v. Enactment of Environment, Forest and Waste Management legal frameworks
vi. Enforcement of relevant environmental legal frameworks
vii. Collaboration with National Government agencies, development partners in environmental conservation initiatives e.g. World Resource Institute (WRI), ICRAF, WRA, NEMA, KFS, KEFRI, CESPAD
viii. Strengthening of established and existing governance structures; Water Resource Users Associations (WRUAs), Sand Management Committees, Climate Change Committees

5.4.2 Collaborative initiatives with WRA and other Stakeholders

Partnerships for integrated water management.

The County Government of Makueni, in collaboration with the Water Resources Authority (WRA), has taken proactive steps to ensure sustainable water management. This includes sensitization and pegging of riparian areas to protect water channels and prevent encroachment. Enforcement of regulations has curbed farming along waterways, ensuring unobstructed water flow to key infrastructure such as earth dams and water pans. A notable example is Ndukuma Earth Dam, which now efficiently serves surrounding communities. Additionally, the riparian area along the Kaiti River in Wote Town has been pegged for conservation, contributing to improved water flow. Sand dams and sumps have been developed to supply Wote Town and its environs. All construction projects in these areas are carried out with the necessary permits, in line with WRA guidelines.

Coordination with environmental conservation agencies.

The County coordinates closely with various environmental conservation agencies through formal partnerships, joint programs, and structured governance mechanisms. The County Department in charge of Environment and Climate Change works alongside National Agencies such as the Kenya Forest Service (KFS), the Kenya Wildlife Service (KWS), the National Environment Management Authority (NEMA), and the Kenya Forestry Research Institute (KEFRI). These collaborations are institutionalized through bodies like the County Environment Committee (CEC), which is gazetted and tasked with overseeing environmental governance, policy implementation, and environmental impact assessments for both county and national projects. Other institutions include the Ward Climate Change Planning Committees that develop proposals for funding as well as oversighting implementation of climate resilience projects at the community level.

The County also works with community-based entities such as Community Forest Associations (CFAs), like Mbooni Community Forest Association (MBOCFOA) to promote participatory forest management and conservation efforts. The County also partners with Civil Society Organizations CSOs), including the ADA Consortium and ADS Eastern as well as private-sector and research actors, to co-develop and implement projects like afforestation, riparian restoration, and sustainable sand harvesting practices.

This coordination translates into actions such as the rehabilitation of degraded lands, the establishment of tree nurseries and woodlots, the enforcement of Environmental conservation legal frameworks and the implementation of the Restoration Opportunities Assessment Methodology (ROAM) framework with partners like the World Resources Institute (WRI). Makueni County also observes global environmental events like World Environment Day (WED), International Day of Forests (IDF) to raise public awareness and deepen community engagement in conservation.

5.4.3 Integrated approach to water resource planning across different Sectors

Climate Change Impacts on Water Resources

i. Increased Rainfall Variability; More erratic rainfall patterns have led to frequent droughts and occasional floods
ii. Reduced groundwater recharge
iii. Degradation of water catchments
iv. Decline in water quality resulting to prevalence of waterborne diseases
v. Resource use conflicts

Adaptation Measures to Safeguard water resources

i. Use of early climate warning systems and create awareness to the community
ii. Catchment restoration initiatives; fencing, tree growing of site matching species, retention walls case of Kiu and Kiboko catchments
iii. Resource mobilization to increase restoration initiatives
iv. Embrace Climate-Smart Agriculture and Soil-Water Conservation initiatives
v. Installation of solar system in water pumping to reduce reliance on fossil fuels
vi. Community involvement in planning for water resources to promote ownership

vii. Strengthening of governance structures like WRUAs on water governance

Cross-sectoral linkages to maximize resource efficiency.

Makueni County adopts a cross-sectoral approach in its development planning to optimize the use of limited resources, enhance service delivery, and promote sustainable development. This integrated model aligns activities across sectors such as water, agriculture, health, infrastructure, environment, and devolution, ensuring synergy and cost-efficiency.

1) **Water, Roads, and Environmental Integration;** The County integrates water resource management with road construction through the Roads for Water Programme. Road infrastructure is designed to incorporate storm water harvesting systems, erosion control features, and water pans, reducing both road degradation and water scarcity. Environmental guidelines provided by NEMA are applied to minimize ecological disruption, particularly during materials extraction and site development.
2) **Agriculture and Infrastructure Linkages;** To boost food security while conserving natural resources, the agriculture sector collaborates with infrastructure Department to introduce climate-smart agriculture practices along transportation corridors, Implement drainage harvesting and farm ponds that leverage runoff from roads, promote agroforestry and reforestation aligned with spatial development plans.
3) **Health and Sanitation Coordination;** The cross-linkages between health and WASH sectors has resulted in improved hygiene and sanitation infrastructure in health facilities and schools, joint programs for controlling waterborne diseases including cholera and typhoid outbreaks, use of health data to inform water quality monitoring and site targeting.
4) **Urban Development and Land Use Planning;** The Lands and Urban Development department supports other sectors by facilitating land acquisition for public utilities like roads, schools and water points, providing GIS and spatial planning tools for site identification and land use harmonization and coordinating urban expansion with environmental and infrastructure planning to reduce conflict and duplication.
5) **Devolution and Public Participation;** The Devolution Sector ensures that planning is inclusive and grounded at the local level through Ward-level planning committees that guide resource allocation based on community priorities, oversight and monitoring of multi-sector projects and citizen engagement forums that foster transparency and collective ownership.
6) Makueni County's success in maximizing resource efficiency is underpinned by a coordinated, multi-sectoral planning framework. The approach not only prevents duplication of efforts but also ensures that development projects are more resilient, community-owned, and environmentally sustainable. Strengthening these linkages and institutional mechanisms remains key to achieving long-term impact and climate adaptation goals.

5.5 Institutional Reforms and Service Delivery Models (SDMs)

5.5.1 Proposed models for urban and rural service delivery

Brief description of existing SDMs and challenges

In Makueni county, there exists a blend of service delivery models. The county is generally rural with over 70% of its population being in the rural areas. Urban/ Semi urban areas benefit from higher population densities, better infrastructure and more resources unlike rural areas. The existing SDMs models for both urban and rural areas include: Water Service Providers; Water User Associations; Private Operators including water vendors (both water bowsers, carts); Water Management Committees; and Institution based (FBOs, Schools & NGOs). The County has three county WSPs and one Inter county WSP of which they all cut across both urban and rural areas. In addition, the County government through the Makueni County Water Act, 2020 sec. 20 it establishes the Makueni Rural Water Board (MARUWAB) whose mandate is to oversight the management of the rural water service provision.

The main challenges include Poor governance and management resulting to low level of services; Low cost recovery systems hence non-functionality; Community groups operating in Isolation and not registered as legal entities; lack of approved tariff; Unsustainable water services (1/3 of rural water systems are dysfunctional; 2/3 start malfunctioning within 3-5 years of construction); lack of control systems to protect right of consumers; and majority of the rural systems are un-regularized.

Proposed Service Delivery Models

The applicable water and sanitation service delivery models for the various settlement types in Makueni county include;

Table 44: Proposed Service Delivery Model

Category	SDM Proposal	Responsible Entity	Key Considerations
Urban and Peri-Urban	Licensed WSPs, Delegated Service Provision	WOWASCO, KIBMAWASCO and MBONWASCO WASREB	NRW reduction, Infrastructure improvement, policy reforms,
Rural and Marginalized Areas	Rural Water Service Providers Water User Associations (WUAs)	County Water Department, MARUWASCO, WUAs, WASREB	Establishment of MARUWASCO, Licensing by WASREB and Delegated Service Provision
Institutions	Sector-managed together with community (Delegated)	Department of Water	Inclusive WASH budgeting, O&M contracts, joint M&E
Rural and Urban	Professionalized management through Private Public Partnerships	Department of Water and Partnerships Directorate	Delegated Service Provision
Public Toilets	PPP or CBO service contracts	Department of Health, Department of Trade and County Administration	User fees, maintenance and hygiene

Lessons from best practices in water governance.

These are some of the key lessons learnt over time from best practices in water governance:

1. Availability of comprehensive county Legal and Policy Frameworks is crucial foundation for processes and procedures. They enable establishment of institutions like MARUWAB and County WSPs, which play vital roles in management of water and sanitation investments.
2. Active involvement of communities in all stages of water and sanitation projects, from identification of needs to management and maintenance, is paramount for sustainability as it enhances ownership. Projects where communities have a sense of ownership tend to perform better and last longer.
3. Supporting and empowering water and sanitation entities including the water committees to manage water resources and services within their jurisdictions, enhances accountability. About twenty water committees have been trained on Integrity Management Tool Box (IMT).
4. Where appropriate, involving the private sector inclusive of the social enterprises, can bring in much-needed investment, technical expertise, and efficiency in water service delivery. However, these partnerships must prioritize public interests and ensure affordability and equitable access.
5. Investing in the skills and knowledge through capacity building of water professionals, community members involved in water management, and county government officials is crucial for effective governance and sustainable service delivery.
6. Establishing clear and accessible mechanisms for resolving water-related disputes at the community and higher levels is important for maintaining social harmony and ensuring equitable water allocation.
7. Investing in data infrastructure and analysis is crucial. The county through partnership established a water asset inventory, which has been building up continuously.
8. Recognizing and proactively addressing the increasing impacts of climate change, is vital for building resilience and ensuring water security in the long term. This includes investing in climate smart technologies.
9. Embracing technological advancements in water and sanitation management, such as smart metering, automated kiosks, remote monitoring, and mobile payment systems improves efficiency, reduces losses, and enhances service delivery.

5.5.2 Governance and accountability mechanisms for water service providers

In Kenya, governance and accountability in the water sector involve a multi-faceted approach, including regulatory frameworks, devolution of responsibilities and corporate governance principles. The Water Act of 2016, along with regulatory bodies like WASREB, play a crucial role in setting standards, licensing providers, and enforcing regulations.

Devolution has shifted responsibilities to county governments, increasing local accountability and transparency. Corporate governance principles are also being integrated to ensure efficient and sustainable service delivery, with a focus on board leadership, financial transparency, and public accountability.

Strengthening oversight and performance monitoring.

Strengthening oversight and performance monitoring for Water Service Providers (WSPs) is a critical element not only for ensuring the provision of safe, reliable water but also for fostering accountability, efficiency and trust between operators, regulatory bodies and the public.

Legal, regulatory and institutional frameworks; a strong legal and policy foundation is essential with clear roles and responsibilities. It lays the groundwork by ensuring that WSPs operate within a system designed for fairness and accountability. The county WSPs will be supported to ensure they have all the requisite internal frameworks which has been a major challenge.

Performance Contracting; it is a critical management tool used to improve service delivery and accountability by focusing on outcomes, Key performance Indicators against the benchmarks and performance targets which involves a negotiated agreement between the county and WSPs. It is a mandatory requirement to enhance service delivery of which the WSPs have been signing. However, there has been a challenge in monitoring which will be strengthened through capacity building of the utility Boards together with the secretariat.

Technology integration; modern digital tools such as real time sensors, leak detectors, automated systems among others, usually transform oversight practices. This is one of the county's flagship agenda on automating services.

Capacity building; supporting the utilities through continuous training programmes customized for both the Board and secretariat will improve oversight and performance monitoring. This would be undertaken in collaboration with the regulator prior to undertaking a comprehensive assessment on the capacity needs. This is because developing human and institutional capacity is as important as the technical systems in place.

The county government will equally enhance its incentives mechanism to boost performance efforts by the utilities targeted to improving service delivery. Currently county departments and agencies are rewarded in each performance contracting cycle based on their performance.

Role of regulatory agencies in ensuring compliance.

Regulatory agencies are essential in ensuring that WSPs comply with established standards, maintain performance benchmarks and ultimately deliver safe, reliable water services to communities. Their role spans from setting the rules to actively monitoring and enforcing them, ensuring that both the providers and the public benefit from accountable, transparent systems.

The main roles include, establishment of regulatory frameworks; monitoring and evaluation; enforcement and corrective measures; capacity building and technical support; and stakeholder engagement.

5.5.3 Strategies for improving financial viability and operational efficiency

Approaches to reduce operational costs.

Reducing operational costs is vital for the sustainability and efficiency of WSPs, especially in contexts where budget constraints and pressing service demands coexist while maintaining service quality.

Leveraging on digitization/ automation and modern technologies in infrastructure is one key approach in reducing operational costs. In addition, automation of administrative processes would reduce overhead costs associated with manual processing and ensure rapid, accurate compliance to documentation. Adoption of modern technologies has been picking up well albeit slowly due to budgetary constraints. One of the targets is to ensure the WSPs have an integrated system, specifically, Enterprise Resource Planning (ERP) to help them streamline their core processes.

Ensuring energy efficiency through investing in energy-efficient technologies, such as solar-powered pumps and conducting routine energy audits greatly reduces the operational energy bill. The county government has an approved county energy plan 2023-2032 which highly promotes green energy. In this the sector within the county has adopted solar powered systems in the water infrastructure which will be enhanced onwards.

Strategic partnerships in capacity building to increase efficiency and resource mobilization in efforts to strengthening governance and WASH systems.

Other approaches would be, strengthening revenue collection through stricter policies and improved service quality, enforcement, debt management, cost reflective tariffs, reducing non-revenue water (NRW), adopting efficient operational practices and embracing data driven governance.

Increasing efficiency through technology and management improvements.

Increasing efficiency through technology and management improvements is essential for WSPs to optimize operations, reduce costs and deliver high-quality services consistently. By blending modern digital tools with refined managerial practices, WSPs will be able to streamline workflows, preempt issues and create data driven systems.

5.6 Sector Financing Requirements and Sourcing Plan

5.6.1 Estimated costs for planned investments and Reforms

To meet the growing water needs and improve service delivery, Makueni County has prioritized an ambitious portfolio of water supply infrastructure projects between 2025 and 2030. These projects target both the construction of new systems and the rehabilitation or expansion of existing facilities, with a focus on solar-powered systems, water treatment, storage and distribution networks.

Key interventions include drilling and equipping boreholes, expanding and treating existing earth dams, automating water kiosks and installing smart metering technology to reduce non-revenue water. The estimated total investment for these interventions is approximately KES 19.55 Billion, with implementation timelines phased annually based on urgency, population served and technical feasibility. A summary of priority projects is annexed to this document.

5.6.2 Strategies to mobilize funding from public, private, and donor Sources

Makueni County requires funding for essential water and sanitation infrastructure and services. To address this, the county will implement a comprehensive strategy to mobilize resources from public, private, and donor sectors, including:

1. **Automation and Digitization of Revenue Collection**: The county aims to enhance efficiency, reduce leakages, and expand the revenue base by implementing digital platforms for revenue collection among water service providers.
2. **Operationalizing Makueni County Water Fund**: The county will activate water fund as outlined in the draft county water fund regulations. This initiative will pool resources from public, private, and civil society stakeholders to invest in sustainable water management and infrastructure projects in designated basins or regions.
3. **Cascading WASH Forums to Sub-County and Ward Levels**: These forums will serve as crucial mechanisms for resource mobilization across sectors such as water development, sanitation, and disaster preparedness. At the sub-county and ward levels, these forums will convene quarterly to plan and review the implementation of WASH programs, uniting stakeholders to address water scarcity, enhance sanitation infrastructure, and improve disaster response capabilities.
4. **Implementation of Appropriate Service Charges**: The introduction of user fees for water and sanitation services will ensure affordability while accurately reflecting service delivery costs.
5. **Conditional Grants**: The county will actively pursue and effectively utilize conditional grants from the national government designated for water and sanitation projects.
6. **Issuance of Infrastructure and Green Bonds**: The county will explore the issuance of infrastructure and green bonds to finance environmentally sustainable water and sanitation projects. An assessment of the county's green finance potential, conducted by FSD Kenya, is underway, alongside the development of a roadmap for borrowing through infrastructure bonds to support key projects.
7. **Public-Private Partnerships (PPPs)**: The county will engage private investors to finance, construct, and operate water and sanitation facilities for a defined period, after which these facilities will be transferred back to the county government for long-term management.
8. **Management Contracts**: The county will collaborate with private entities to efficiently manage and operate its water and sanitation systems.
9. **Engaging Local Businesses**: The county will encourage local businesses to invest in or support water and sanitation initiatives as part of their corporate social responsibility efforts. Ongoing engagement with the private sector in health and water will help develop partnership frameworks to strengthen these collaborations.
10. **Request for Grants and Concessional Loans**: In collaboration with the national government, the county will seek grants and low-interest loans from international development partners such as the World Bank, African Development Bank, and European Union to finance key water, sanitation and hygiene projects. The county has already received technical assistance from the World Bank to develop its sanitation strategy.

5.6.3 Financial sustainability plans, including tariff adjustments and subsidy mechanisms

a) **Conditional Grants:** Makueni County receives conditional allocations and grants from the national government and other development partners, some of which are directed towards the water sector. These funds will serve as a subsidy, alleviating the financial burden on local users and the water service providers.

b) **Targeted Subsidies:** Makueni County will consider or implement targeted subsidies for vulnerable populations in line with national policies to ensure access to affordable water. This will involve lower tariffs for specific groups or subsidies for water connections.

c) **Donor Support:** some of the development partners in the county provide financial and technical assistance to the water sector which act as a subsidy, supporting infrastructure development and capacity building.

d) **Climate Finance:** As Makueni explores green finance, some funds may be available on concessional terms or as grants, effectively subsidizing climate-friendly water projects such as solar-powered water pumps.

e) The focus on economic development and investment suggests that exploring public-private partnerships for future water projects may be beneficial.

f) **Efficient Water Management:** The county is working on automating water draw-off points and addressing commercial water supply losses to enhance efficiency and financial viability thereby reducing non-revenue water.

g) **Community involvement through the project management committees and sustainability committees:** The county will engage members of public in managing water resources and ensuring financial transparency for the sustainability of implemented water projects.

h) **Tariff Adjustments:** The county will collaborate with Water Services Regulatory Board (WASREB) in reviewing and approving tariff adjustments in Kenya, taking into account the needs of both service providers and consumers.

6.0. ENVIRONMENTAL AND SOCIAL ASSESSMENT

6.1. Environmental, Health, and Safety in the WASH Sector

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

Makueni County faces several environmental, health and safety risks within its Water, Sanitation and Hygiene (WASH) sector.

Environmental Risks

i. **Pollution and degradation of water sources**; This results from unsustainable land use practices, deforestation, encroachment and poor waste disposal practices which leads to siltation, drying of water sources, and destruction of catchment areas. The County has also experienced oil spill incidents which have posed contamination risk to both surface and underground water. Thange and Kiboko Oil spill incidents.

Some settlements lack proper, adequate and separate sanitation facilities for both genders increasing the risk of environmental contamination, especially during flash floods and heavy rains

ii. **Drought**; The County faces frequent droughts, erratic rainfall and flash floods, especially in the lower zones like Kibwezi East and West, leading to acute water shortages for domestic, agricultural, and livestock use. Unreliable rainfall patterns with prolonged droughts lead to drying up of water sources, decline in ground water recharge and increase in water salinity

iii. Health Risks

Water borne & Vector borne diseases; Poor water quality and lack of sanitation during droughts or flash floods cause outbreaks of cholera, typhoid, and diarrhea especially in flood-prone areas. Poorly managed water sources can also act as breeding sites for mosquitoes leading to upsurge of Malaria.

Poor hygiene infrastructure; Many public institutions have inadequate functional latrines or handwashing facilities exposing the learners to diseases.

iv. Safety Risks

Work injuries/accidents; During WASH projects implementation especially construction phase, the site casuals/staff are exposed to injuries, accidents and diseases resulting from handling of raw materials, exposure to noise pollution, air pollution from dust prone areas and emissions from machinery, poor waste management and assemblage of construction materials.

Flooding and Infrastructure damage; Occurrence of flash floods damage water pipelines, boreholes, and sanitation systems, especially those not climate-proofed. Flash flood events overwhelm poorly designed latrines, eventually collapsing and causing contamination of nearby water sources.

Human-Wildlife conflicts; In scenarios of water scarcity and drought events, wildlife move into community areas in search of water and food and at times damage water and sanitation infrastructure as well as endangering human safety. This has been witnessed in areas of Kibwezi East and Kibwezi West.

In dry seasons, most citizens walk to nearby river bodies to fetch water especially main rivers like River Athi where cases of crocodile, hippopotamus attacking livestock and humans have been reported including fatality cases.

Community Exposure during Water Collection; Walking long distances to water points especially for women and children exposes them to gender-based violence and heat stress.

6.1.2 Measures to manage and mitigate the existing environmental, occupational health and safety in the WASH sector

Table 45:Measures to manage and mitigate the existing environmental, occupational health and safety in the WASH sector

Risk Category	Risk Type	Mitigation Measure
Environmental	Pollution and Degradation of water sources	Promotion of Sustainable Land Management Practices (SLM) Afforestation, reforestation and agroforestry practices Proper solid waste management Construction of sanitary facilities in WASH projects Protection of water sources from encroachment Enforcing polluter pay principle Scaling-up community led total sanitation initiatives
	Water Scarcity	Afforestation, reforestation and afro-forestry practices Harvesting of water through construction of earth dams, shallow wells, water sumps, sand dams, boreholes and promoting roof water harvesting Expansion of existing water infrastructure and ensuring last mile connectivity Protection of water sources; springs, wetlands, catchments
Health Risks	Water borne & Vector borne diseases	Construction of sewerage infrastructure; DTFs Construction of sanitary facilities Continuous awareness on community led total sanitation Routine water quality monitoring Installation of water treatment components Promote affordable household-level water treatment
	Poor hygiene infrastructure	Ensuring quality works for sanitary facilities Provision of hand wash points Timely exhaustion of sanitary infrastructure
Safety Risks	Work injuries/accidents	Providing workers in all WASH programs and projects with adequate Personal Protective Equipment (PPEs) Compliance with OSHA, 2007 and WIBA 2007. Proper signage at work places

Risk Category	Risk Type	Mitigation Measure
		Employing safety expert in ongoing WASH projects Training personnel on safety and emergency preparedness
	Flooding and infrastructure damage	Climate proofing of WASH infrastructure Elevation/reinforcement of vulnerable systems (e.g., borehole caps, tanks, electric cables). Use solar pumping systems to reduce reliance on the grid and ensure sustainability Development of emergency response plans for infrastructure failures Capacity building of management committees on proper repair and maintenance of damaged infrastructure
	Human-Wildlife Conflicts	Constructing water bodies in the wildlife areas Last mile connectivity ensures community access water from safe communal points Budgetary allocation for extension of electric fence in areas of Kibwezi east
	Community Exposure during water collection	Last mile connectivity to reduce distance to water sources

6.1.3 Water abstraction permits from the Water Resources Authority (WRA) for all planned and existing water sources

Water abstraction from surface and groundwater sources requires a permit from the Water Resources Authority (WRA). This is in compliance with the Water Act, 2016 and the Makueni County Water Act, 2020. Makueni County is endowed with numerous rivers, boreholes, sand dams, springs and wetlands and must regularize all such abstractions to ensure sustainability, legal compliance and effective water governance.The plan will be key in ensuring there is a verified database of all water abstraction points in the County, ensure the Department applies and obtains WRA permits for all eligible water points and help in building capacity within local water user associations (WRUAs) on abstraction compliance.

In planning for obtaining the water abstraction permits, the following activities are undertaken;

1) Mapping & registration of all water sources; existing and planned
2) Categorization of sources by permit status; compliant, expired and non-permitted.
3) Engagement meetings with Water Resources Authority (WRA)
4) Preparation & submission of permit applications with all required attachments
5) Tracking application progress
6) Training Water Resource Users Associations (WRUAs) and sustainability committees on permit compliance and monitoring

6.1.4 Obtaining appropriate Environmental and Social Impact licenses for the schemes and projects

Environmental Social Impact Assessment is a systematic process used to identify, predict, and evaluate the potential environmental and social impacts of a proposed project before it is implemented, and to develop ways to avoid or reduce negative effects and enhance positive ones.

All water projects and schemes in Makueni County will adhere to Environmental Impact Assessment and Audit Regulations 2003 and the Legal Notice 31 & 32 of 2019 that require water projects to undergo environmental assessments. This will be done through environmental screening to check against the risk category that the project falls under and initiate a budget to undertake the report based on the risk category where a licensed NEMA Lead Expert or firm of experts will be engaged and submit the report to NEMA for license consideration.

6.1.5 Monitoring Environmental, Health and Safety Performance Of Proposed Water And Sanitation Investments

Once the water projects and schemes are issued with NEMA approval or NEMA license, the proponent will ensure all license conditions are adhered to and in addition, the proponent will implement the Environmental Social Monitoring Plan (ESMP) developed in the ESIA report. The Environmental, Social and Health compliance team will be composed of an Environmentalist, Sociologist and a Health Expert who will ensure projects activities conform to standards. The team will use the plan as shown below in monitoring and reporting for different components

Table 46:Monitoring Environmental, Health And Safety Performance Of Proposed Water And Sanitation Investments

Component	Indicators	Monitoring Methods	Responsible Parties	Frequency
Environmental and Social Safeguards	• No of ESIA reports done • No of Environmental and Social Audits done • No of complaints logged in grievance register	• Routine inspections to check on compliance • Reviewing registered complaints	Environmental, Social and Health Experts NEMA	Continuous
Water Quality	• PH, turbidity, microbial and chemical contaminants • Soil quality near project sites • Waste management practices • Energy resource efficiency	• Monthly sampling • Lab analysis • Spot checks at water points	Department of Water Contractors Community	Monthly

Component	Indicators	Monitoring Methods	Responsible Parties	Frequency
	• Biodiversity impacts			
Sanitation facilities	• Access to safe sanitation • Facility conditions and maintenance	• Physical inspections • Community surveys and feedbacks	Contractors Operators	Monthly Quarterly
Worker safety	• No. of workplace accidents/injuries • PPE usage • Safety training completion • OHS compliance audits	• Site inspections and audits • Review of safety logs and incident reports	OHS Experts Contractors	Bi-weekly (construction) Monthly (Operation)
Community Health	• Incidence of water borne diseases • Health complaints • Access to clean water and sanitation	• Health surveillance through clinics • Household surveys • Coordination with Health Department	County public health officers Community Health Resource volunteers Environmental & Health experts	Monthly updates

To ensure there is proper reporting and feedback mechanism during project implementation the Environmental, Social, Safety and Health experts will ensure;

- There are Quarterly EHS Reports summarizing findings, compliance status, and corrective actions
- Biannual Stakeholder Meetings are conducted to review performance and gather input.
- There is a Grievance Redress Mechanism to address community complaints promptly and transparently.

6.2. Social Assessment for the County

6.2.1 Situation analysis on social risks in the WASH sector

It is noteworthy that the WASH sector plays a vital role in public health, education, and overall socio economic development. Gender and disability mainstreaming in water and sanitation initiatives is critical for achieving sustainable and equitable development in Makueni County. The County has recognized the need to adopt a multi-sectoral approach that incorporates gender sensitive planning, community engagement and investment in accessible, safe and affordable sanitation infrastructure tailored to the diverse needs of its population.

Gender and WASH

In Makueni County, access to sanitation remains a critical public health and social equity issue with significant disparities based on gender and social vulnerability. While national and county-level efforts have made progress in expanding basic sanitation services, women, children, persons with disabilities,

elderly and other marginalized groups continue to face challenges in accessing safe, adequate and dignified sanitation facilities.

Gender-disaggregated data indicates that women and girls are disproportionately affected by poor sanitation within the county. Inadequate access to gender-responsive sanitation infrastructure exposes them to health risks, limits their privacy and safety and often leads to social stigma especially during menstruation, pregnancy and caregiving responsibilities.

According to the 2022 Kenya Demographic and Health Survey (KDHS) Fact Sheet for Makueni County, only 46% of the household population has access to at least basic drinking water services. This figure is lower than the national average of 68%. Similarly, 46% of households in Makueni have access to at least basic sanitation services, which is slightly higher than the national average of 41%.

It is noteworthy that the limited access to water and sanitation services disproportionately affects women and girls, who are traditionally responsible for water collection and maintaining household hygiene. Tragically, incidents such as crocodile attacks have occurred, leading to measures like restricting women and girls from accessing certain water points during menstruation due to beliefs about increased danger.

Moreso, women and children sometimes face gender-based violence, harassment or assault risks during long walks to water points. This task reduces the time available for education, income-generating activities and community participation. A 2021 UN Women report from lower Eastern Kenya (including Makueni) documented multiple incidents where young girls were attacked while traveling to distant water points early in the morning or late at night. Besides, the problem of access to water and sanitation is even worse for persons with disabilities and the elderly because they cannot walk long distances to get this important resource.

In addition, the County is prone to flooding affecting the access to sanitary facilities to an extent of evacuating the displaced households making women, children, aged and people with disability vulnerable to extreme conditions.

Vulnerable Groups and WASH

Vulnerable populations, including the elderly, people with disabilities, female headed households and ultra-poor households frequently encounter additional barriers due to the location, design or affordability of available sanitation facilities. For instance, poorly maintained or distant latrines compromise privacy and safety, discouraging use and sometimes leading to open defecation. The absence of inclusive and disability-friendly sanitation services exacerbates social exclusion and limits these groups' participation in education, economic activities and public life.

Furthermore, the burden of managing household sanitation and water-related duties disproportionately falls on women and girls thus affecting their time, health and opportunities for advancement. It is therefore evident that access to water and sanitation services in Makueni County exhibits notable disparities that have significant implications, particularly for women, elderly, children and PWDs.

The Government of Makueni County has made strides in improving water and sanitation infrastructure. However, disparities persist, particularly affecting women, elderly, children and PWDs. The limited access to water and sanitation services disproportionately affects women and girls, who are traditionally

responsible for water collection and maintaining household hygiene. This responsibility often exposes them to various risks, including gender-based violence.

6.2.2 Measures to manage and mitigate the existing social risks in the WASH sector

Community Conflict Risks

In many parts of Makueni, women and girls are primarily responsible for fetching water. Long dry spells and limited water points have led to conflicts between households and communities, especially when people from different villages converge at scarce water sources. A 2020 study by Water.org and SNV Kenya in Makueni highlighted that women reported harassment, queue conflicts and verbal abuse at crowded water points. Men sometimes block women from accessing boreholes, particularly in areas where men dominate water committees.

A significant portion of land in Makueni County remains un-adjudicated, and only a small percentage have title deeds. This lack of clear documentation makes it difficult to establish ownership and can lead to disputes. For instance, people have donated land for water infrastructure without properly transferring, ownership rights, leading to conflicts thus hindering service delivery. Further, WASH project planning and resource allocation often exclude input from youth and vulnerable groups causing resentment and resistance to implementation.

Increasing land grabbing and encroachment on public land can lead to conflicts over water resources especially in areas where water sources are scarce. This can disrupt the intended benefits of WASH projects and create tensions within communities.

Land ownership and documentation for water and sanitation infrastructure

In Makueni County, challenges related to land ownership and documentation for water and sanitation infrastructure include lack of clear titles, disputes over land for infrastructure and inadequate legal frameworks. Besides, majority of women in the County have limited access and control over land and family property. Therefore, family land and title deed ownership are vested in men and controlled and inherited along the male lineage.

In addition, land tenure challenges including insecurity and inadequate management have significantly impacted WASH projects in Makueni County. Specific examples include succession drawback since many of the registered proprietors are deceased, land grabbing, and historical land injustices. In March 2025, Makueni County launched a land succession initiative aimed at assisting residents, including women, in navigating the complex land succession process.

More so, there are issues of slow and unconcluded land adjudication and settlement processes in some areas within the County. This insecurity can make it difficult to secure long-term agreements for WASH infrastructure as residents might not be willing to invest in projects that could be threatened by future land disputes.

Procedures for land acquisition

In Makueni County, land acquisition adheres to procedures outlined in the Land Act of 2012, ensuring fair compensation and minimizing displacement. This includes public notice, consultation with affected parties, valuation report from a government valuer to advise on compensation and assessment of just compensation including potential resettlement and rehabilitation of displaced individuals. The acquisition of land for public use must adhere to the Public Procurement Act.

Detailed procedure:

1. Public Notice and Consultation (Advertisement): The government initiates land acquisitions by issuing a public notice in the Gazette, informing the public about the intended acquisition. A copy of the notice is delivered to all potentially interested parties. Subsequent steps involve engaging with the community including holding public hearings and consultations to address concerns and build consensus.
2. Land Suitability Assessment: The government may authorize individuals to enter the land, survey it and assess its suitability for the proposed project.
3. Just Compensation Assessment: The Land (Assessment of Just Compensation) Rules 2017 provide guidelines for determining fair compensation. Compensation is calculated based on the land's current market value, including structures and improvements as well as any loss of income or livelihood resulting from the acquisition. If the community is not registered, the compensation is held in a special account until they become registered.
4. Land Registration: This entails mutation (subdivision, partition, amalgamation) or transfer of property).
5. Resettlement and Rehabilitation:

If displacement is necessary, the process should include:

   - Resettlement Action Plan (RAP): A detailed plan outlining the resettlement process, including the selection of new land, provision of housing and support for livelihood restoration.
   - Community Engagement: Regular communication with the affected community to address their concerns and ensure their participation in the resettlement process.
   - Fair Compensation for Resettlement: Individuals and families displaced should receive compensation for their lost land, assets, and livelihoods as well as support for their resettlement and rehabilitation.

6. Grievance Mechanism: A transparent and accessible grievance mechanism should be established to allow affected parties to raise concerns about the land acquisition process and seek redress.
7. Dispute Resolution: A formal dispute resolution process should be in place to address any disagreements or disputes that may arise during the land acquisition process.
8. Monitoring and Evaluation: The entire land acquisition process should be monitored and evaluated to ensure compliance with legal requirements and best practices and to identify areas for improvement.

We envision that by addressing barriers/social risks and promoting inclusive policies, the county can enhance access to safe water and sanitation for all, particularly marginalized groups. Despite ongoing investments in the WASH sector including development programs, the sector faces several social risks that can undermine service delivery and equitable access. Some of these social risks in the WASH sector include;

Table 47:Social Risks in the WASH sector

NO	SOCIAL RISK	MITIGATION MEASURES	RESPONSIBLE AGENCY/ ACTOR	TIMELINE/ FREQUENCY	PROPOSED BUDGET
1.	Communal and other forms of conflicts/grievances	a) Establish and capacity build sustainability committees b) Promote mediation and conflicts resolution mechanisms	Devolution	Annually	5,000,000
2.	Displacement of people from their land	a) Conduct Social Impact Assessment b) Enforce regulations that prevent forced evictions without due process, fair compensation, and resettlement plans. c) Accessible and responsive systems for communities to report and resolve disputes.	Gender	Annually	5,000,000
3.	Land ownership and documentation for water and sanitation infrastructure	a) Conduct comprehensive land tenure assessments b) Clear mechanisms for compensation and resettlement on land acquisition for WASH projects c) Engage communities and stakeholders actively d) Ensure transparency and integrity in land transactions	Lands	Annually	5,000,000
4.	Gender-based violence/sexual exploitation and abuse	a) Strengthen legal and policy frameworks b) Prevention through awareness and education c) Community engagement and empowerment d) Promote multi-sectoral collaboration	Gender	Annually	5,000,000
5.	Child labour	a) Strengthen and enforce laws	Gender	Annually	5,000,000

NO	SOCIAL RISK	MITIGATION MEASURES	RESPONSIBLE AGENCY/ ACTOR	TIMELINE/ FREQUENCY	PROPOSED BUDGET
		b) Alleviate poverty through social protection programs c) Raise awareness/community campaigns on child rights and protection			
6.	Gender inequality	a) Conduct gender analyses to understand how men, women and other groups experience WASH differently b) Encourage active participation of women in WASH committees and leadership roles c) Use community dialogue to address gender norms and raise awareness about the different WASH needs of men and women d) Include men and boys in conversations about menstrual hygiene and caregiving roles to reduce stigma and share responsibilities e) Implement WASH education in schools with a gender lens including menstrual hygiene management (MHM) f) Train local leaders and CHPs on gender equality and inclusive practices in WASH g) Promote life skills and leadership training for women and girls to boost confidence and participation h) Ensure that sanitation facilities are private, clean, and equipped with water and disposal systems	Gender Devolution Health Services Water	Annually	10,000,000

NO	SOCIAL RISK	MITIGATION MEASURES	RESPONSIBLE AGENCY/ ACTOR	TIMELINE/ FREQUENCY	PROPOSED BUDGET
		i) Promote gender sensitive planning, decision making inclusion and participation, include special interest groups in WASH committees and leadership roles			
7.	Loss of cultural heritage	a) Involve communities from the start in the design, planning, and implementation stages b) Conduct cultural mapping to identify for instance, Sacred water sites (e.g. springs, rivers, wells), Traditional hygiene practices and Community-defined taboos or rituals c) Documentation and safeguarding traditional water-use stories, rituals, or designs and sacred sites or culturally significant practices threatened by development d) Promote intergenerational knowledge transfer on water stewardship and hygiene e) Establish feedback mechanisms so communities can report cultural conflicts or losses during WASH rollouts.	Gender Devolution Health Services Water	Annually	5,000,000
8.	Lack of gender-disaggregated toilets	a) Conduct gender-sensitive assessments-involve both women and men in assessing WASH needs, with a focus on privacy, safety and accessibility b) Advocate for inclusive policies that mandate gender-disaggregated	Gender Devolution Health Services Water	Annually	5,000,000

NO	SOCIAL RISK	MITIGATION MEASURES	RESPONSIBLE AGENCY/ ACTOR	TIMELINE/ FREQUENCY	PROPOSED BUDGET
		facilities in schools, public places and emergency settings c) Build separate facilities- construct clearly marked, separate toilets for males and females, with lockable doors, adequate lighting and water access d) Consider menstrual hygiene needs- Include disposal bins, water supply and washing areas for menstrual hygiene management (MHM) e) Accessible design- Ensure toilets are accessible to people with disabilities, including women and girls with mobility challenges.			
9.	Inadequate stakeholder engagement	a) Undertake stakeholder mapping and analysis b) Involve stakeholders in the planning and decision-making phases, not just during implementation c) Tailor messages for different groups, considering gender, age and education levels d) Train stakeholders (especially local communities) to understand WASH concepts, technologies and maintenance	Gender Devolution Health Services Water	Annually	5,000,000
10.	Accessibility barriers	a) Disaggregate data- collect and analyze data by age, gender, disability and location to understand specific barriers b) Involve people with disabilities, women, and other underrepresented	Gender Devolution Transport Health Services Water	Annually	5,000,000

NO	SOCIAL RISK	MITIGATION MEASURES	RESPONSIBLE AGENCY/ ACTOR	TIMELINE/ FREQUENCY	PROPOSED BUDGET
		groups in planning, design and monitoring of WASH projects c) Ensure WASH facilities (toilets, water points and handwashing stations) are: d) Physically accessible (e.g., ramps, grab bars, wider doorways) -Culturally appropriate (e.g., private spaces for women) -Close to home and usable without assistance e) Train WASH champions and local administration on Disability inclusion, Gender sensitivity and Rights-based approaches			
11.	Health and hygiene challenges	a) Improve access to clean water b) Strengthen governance and policy c) Promote proper sanitation facilities d) Promote hygiene education and behaviour change e) Promote sustainable and resilient solutions	Health Services Water Devolution Gender	Annually	5,000,000
12.	Educational and economic barriers	a) Community engagement and ownership b) Mobile Apps and Digital Solutions-Use mobile applications or SMS services to provide real-time water quality data, schedule maintenance and inform communities about water access and sanitation issues c) Inclusive Decision-Making-Ensure that women, children, and marginalized groups are included in the planning	Education Health Services Water Devolution Gender	Annually	5,000,000

NO	SOCIAL RISK	MITIGATION MEASURES	RESPONSIBLE AGENCY/ ACTOR	TIMELINE/ FREQUENCY	PROPOSED BUDGET
		and implementation of WASH projects. Women, in particular, are often the primary water collectors and can provide valuable insights into the challenges faced by their communities d) Community-based education and behaviour change campaigns			
13.	Burden of climate related roles	a) Integration of Climate Resilience into WASH Plans b) Water Source Management and Protection c) Building Community Resilience and Capacity d) Technology and Innovation e) Financing and Resource Mobilization	Education Health Services Water Devolution Gender Finance	Annually	5,000,000

Analysis of users' willingness to pay for WASH services, considering the impact of new investments on water tariffs.

Makueni County, like many rural areas in Kenya face challenges in access to safe water, poor sanitation facilities and inadequate hygiene practices. Improving these services often requires significant investments. These new investments could be in the form of upgrading or expanding water supply systems, constructing new sanitation facilities or enhancing community hygiene awareness. The investments can be funded through public or private sources, partnerships with strategic partners and well-wishers.

Understanding users' willingness to pay for WASH services in Makueni County, while considering the impact of new investments on water tariffs, requires a multifaceted approach. It is crucial to consider the socio-economic conditions of the population, the nature of the investments, and how tariffs are structured. Policymakers must balance the need for investment recovery with affordability and public acceptance to ensure sustainable and equitable access to improved WASH services.

Overview of household income distribution and average expenditure on basic needs in Makueni County

a) Household Income Distribution

i. **Gini Coefficient**: Makueni County has a Gini index of 0.376, indicating moderate income inequality.
ii. **Poverty Rates**: As at 2015, 26.6% of Makueni's population lived on less than Kshs 215 per day, and 58.2% lived on less than Kshs 365 per day.

b) Average Expenditure on Basic Needs

i. **Food Security**: Only 2% of households are food secure year-round, with 97% struggling to secure enough food for more than two months annually.
ii. **Cooking Fuel Usage**: A significant majority (85%) of households rely on firewood for cooking, while only 15% use liquefied petroleum gas (LPG).

Factors Affecting Willingness to Pay (WTP)

1) **Income Level:** The economic status of the population is a key determinant of WTP. Makueni County has a predominantly agricultural economy and most households may have limited disposable income. WTP will therefore depend on the perceived value of WASH services relative to household income.
2) **Perceived Benefits:** If users believe that the new investments will significantly improve the quality and reliability of services (e.g., reducing waterborne diseases, increasing water availability), they may be more willing to pay. WTP is often higher when users see direct and tangible benefits to their health and livelihoods.
3) **Quality and Reliability of Current Services**: If current services are unreliable, expensive, or of poor quality, users may be more willing to pay for an improvement, especially if they expect the new investments to address these issues.
4) **Tariff Structure:** A transparent and equitable tariff structure is crucial. If the water tariffs are perceived as unfair or disproportionate to the service quality, users may be less willing to pay. Tariffs that are tiered or based on consumption levels may be more acceptable.

Policy Implications

1) **Affordability Concerns:** Ensuring that tariffs remain affordable to the majority of the population, particularly the ultra-poor households' is crucial. Policymakers should consider a progressive tariff system that takes into account the financial ability of different user groups to pay.
2) **Alternative Financing Models:** Exploring financing models such as public-private partnerships (PPP), micro-financing for water connections or donor-funded initiatives may help mitigate the burden of high upfront costs for the population.
3) **Public Awareness and Stakeholder Involvement:** Engaging the community in the planning and decision-making process around new investments will increase the likelihood of successful implementation. Public awareness campaigns about the benefits of investing in WASH infrastructure can enhance users' willingness to pay.
4) **Monitoring and Accountability:** Establishing mechanisms for monitoring service quality and ensuring accountability can help justify higher tariffs if services improve over time.

Institutions dealing with social issues during project implementation within the county

The following institutions deal with social issues during project implementation within the county:

Table 48:Institutions Dealing With Social Issues During Project Implementation Within The County

No.	Department/Ministry	Role in WASH projects
1.	Gender, Children, Youth, Sports & Social Services	a) This is mandated to oversee and ensure that social issues are effectively articulated during project implementation. b) Conduct social safeguards assessments c) Monitor social safeguards during project implementation
2.	Health Services	Creation of awareness on sanitation and hygiene services at community level including health education, advocacy and promotion of sanitation services and uptake programmes such as CLTS; ensuring compliance to standards and guidelines in institutions such as schools and health facilities; management of sanitation facilities such as incinerators; oversight, law enforcement as well as to provide technical support to communities, institutions and other departments of the two levels at governments within the County.
3.	Water and Sanitation	Mandated to ensuring that all County residents have access to safe, reliable and affordable water and sanitation services
4.	Lands Urban Planning & Development, Environment and Climate Change	d) Undertaking environmental social safeguards assessments e) Ensuring that there is no forced land acquisition f) Monitoring environmental social safeguards during project implementation g) Mainstreaming gender in all stages of planning
5.	ICT, Education & Internship	The Department of Education is responsible for provision of sanitation facilities to ECDEs and CTTIs in the County, including latrines, hand-washing facilities, provision of water storage (tanks) facilities and health education in schools.
6.	Infrastructure, Transport, Public Works & Energy	Mandated to provide designs, bill of quantities, construction and supervision of drainage channels.
7.	Devolution, Public Participation, County Administration & Special Programs	a) Enhance effectiveness of WASH program by promoting local governance, ensuring mobilization and involvement of communities through mapping of target beneficiaries, promote project ownership and facilitate resource allocation and capacity building. b) Establish and strengthen linkages and networks with development partners and stakeholders.

Community Health Issues

The community health approach focuses on ensuring the delivery of quality community health services while embracing the principles of protection of the rights and fundamental freedoms of the vulnerable and special groups. This is geared wholly on community engagements to ensure that gains are sustained. It is focused on community health leadership and governance, mobilization of community resources, improved accessibility to community health service delivery, available and sufficient community health

products, community-based health information system and sustainable financing of community health services. The construction of projects must consider community health issues like exposure to hazards, traffic risks, and potential impacts on sanitation and waste management. They also need to assess the capacity of local health systems and ensure equitable access to healthcare services, particularly for vulnerable groups.

The responsible department will ensure the following measures are considered during construction of projects during the project life cycle

i. Community or individual signed land acquisition agreement between both parties
ii. Provision of adequate personal protective equipment as per the occupational Safety and Health act and regulations
iii. Provision of community signage with details of the project and emergency safety measures
iv. Awareness creation on HIV/AIDs through health education, distribution of Information, Education and Communication materials
v. Approved detailed plans of the project design
vi. Provision of sanitary facilities for safe human waste disposal including hand washing points
vii. Provision of quality drinking water
viii. Provision of security measures during construction, fencing of the projects
ix. Provision of environmental impact assessment (EIA) report
x. Protection of the special interest groups
xi. Traffic and road reduction risks through risks assessment
xii. Management of the ecosystem and natural habitat

Presence of an integrated unit dealing with the environmental and social issues within the county

The Government of Makueni County does not have an integrated unit dealing with environmental and social safeguards. The ideal situation currently being utilized is secondment of requisite skilled staff to support various programs like Financing Locally Led Climate Action (FLLoCA), Kenya Devolution Support Program (KDSP) II and National Value Chain Development Programme. All are supported by seconded County staff from Departments responsible for Environment and Gender matters respectively.

There is proposed establishment of an integrated and dedicated Environmental and Social Safeguards unit to be anchored under the Department in charge of Environment and Climate Change matters. This calls for development of County Environmental and Social Safeguards Unit guidelines for the unit.

The proposed mandate of the unit would entail the following duties among others as it will be spelled out in the guidelines;

i. Developing and implementing County Environmental, Social, Health and Safety policies, plans and procedures
ii. Coordinating ESHS activities across all Departments and projects in the Counties
iii. Reviewing the County plans and provide guidelines to ensure ESHS compliance and sustainability

iv. Monitoring ESHS performance of the County and report to the County leadership and other relevant National Government Units.
v. Capacity building and promotion of ESHS in the Counties
vi. Developing and maintaining Stakeholder Engagement Plan (SEP) within and between Counties and other relevant stakeholders
vii. Ensuring during implementation of KWASH in the County there is inclusion of ESHS clauses in the bidding and contract documents for civil works, including signing a code of conduct by contractor employees.

The Integrated Environmental and Social Safeguards Unit is proposed to be composed of a multi-disciplinary team preferably; Environment Social Safeguards Officer, Social Safeguards Officer, Public Health Specialist, GRM focal Personal, OHS Specialist, Economist, County Administrator and cooption of other key technical officers on need basis.

County budget provision for implementation of social issues such as community, stakeholder engagements, capacity building, etc

The County Government does not have centralized budget provision for implementing social issues. However, every Department has set aside allocation for handling social issues during project implementation. These include Departments responsible for Gender and Social Protection, Devolution, Public Participation, County Administration and Special Programmes matters as well the Environment and Climate Change.

7.0. IMPLEMENTATION ROADMAP, MONITORING AND EVALUATION, AND COMMUNICATION PLAN

7.1 Strategy and Investments Implementation Plan

7.1.1 Step-by-step action plan for executing the strategy

Key phases and milestones for implementation.

The Makueni County Water and Sanitation Strategy and Investment Plan will be executed in **three main phases**, in alignment with County Vision 2025, the 2023-27 CIDP, and Kenya Vision 2030. The plan spans eight financial years, from February 28, 2024, to June 30, 2031. The **first phase**, which focuses on planning and design, will occur during the financial years 2023/24 and 2024/25, specifically from February 28, 2024, to June 30, 2025. The **second phase** will take place from financial years 2025/26 to 2027/28. Finally, the **third phase** will extend from financial years 2028/29 to 2030/31. This final phase will include components that go beyond the current county planning frameworks while remaining aligned with the Sustainable Development Goals (SDGs), Kenya Vision 2030, and the National Water and Sanitation Investment and Financing Plan (NAWASIP).

The key milestones under each of the phases are as detailed in the following table: -

Table 49: Key implementation milestones and phases

No	Phase	Financial Years	Key Milestones
1.	I	2023/24-2024/25	This phase involves formulating the plan and collecting baseline data to report on WASH activities in the county. The primary output is a baseline survey report for these activities, along with the approved Makueni County Water and Sanitation Strategy and Investment Plan. Although few WASH programs and projects were implemented during this phase, funding came from both the county budget and development partners.
2.	II	2025/26-2027/28	This is the primary implementation stage of the plan, during which w the following outcomes and key outputs will be achieved: a) The Proportion of HH accessing safe water will increase from 44.2% in 2023 to 70% by June 2028. b) The average distance to the nearest water source will reduce from 5 kms in 2023 to 2 kms by June 2028. c) The proportion of schools with required sanitation & hygiene standards will have reached 50% by June 2028. d) A total of 4,500 villages will have been declared ODF e) A total of 60,000 community awareness campaigns will have been conducted on WASH activities.
3.	III	2028/29-2030/31	This stage represents a milestone in self-actualization for WASH (Water, Sanitation, and Hygiene) in the county, as the key indicators will have been met. The main activities will concentrate on achieving Sustainable Development Goal 6, which aims to provide clean water and sanitation for all citizens. In urban sanitation, the county will have

No	Phase	Financial Years	Key Milestones
			completed the construction of sewerage facilities in the primary urban centers of Wote, Kibwezi, Makindu, Emali, Sultan Hamud, and Kikima.

Stakeholder roles and responsibilities.

This section illustrates the different stakeholders in the sector and their roles in development

Table 50: Stakeholder roles and responsibilities

Stakeholder	Responsibilities	Possible areas of collaboration
World Vision Kenya, GAA, Tanathi Water Works Development Agency, Kenya Red cross Utooni development services, Africa sand dam foundation, NDMA, Water mission, Child Fund, Dorcas Aid, World Bank, CESPAD and USAID-KIWASH	Increasing access to water, hygiene and sanitation through infrastructure development	• Infrastructure development and maintenance • Capacity building • Emergency response • Development of Legal frameworks • Implementation of WASH programmes
ADSE	• Climate Change adaptation	• Capacity building
WRUA NEMA WASREB Water Resource Authority World Resource institute	• Promotion of irrigation and river protection • Protection and management of Water resources • Environmental conservation • Regulation of water service provision	• Governance of water sources • Water catchment protection • Land restoration • Compliance and enforcement • Capacity building
CFAs TARDA, Kenya Water towers Agency	• Natural resource management and conservation	• Water towers protection •

7.1.2 Responsibilities of key institutions and stakeholders

Makueni County has established robust, county-led multi-stakeholder coordination mechanisms that bring together government departments, civil society, community-based organizations (CBOs), non-governmental organizations (NGOs), private sector representatives, and development partners to drive sustainable development and climate resilience. Here's an outline of the key mechanisms:

There exists a directorate in charge of strategic partnerships, liaison and intergovernmental relations which focuses on fostering collaborations and partnerships to advance development projects and initiatives. It plays a key role in identifying areas of synergy with various stakeholders, both within and outside the county, to implement development work that benefits the residents. This directorate is also involved in activities like reviewing existing collaborations, engaging with development partners, and developing strategies for implementing county initiatives.

Public participation and community forums; grassroots engagement beyond formal documents and committees, Makueni County continuously and actively promotes direct community involvement though community forums where they are able to prioritize their needs and county officials often get an opportunity to explain policies and project decisions. Communities are also able to discuss development matters within their villages, clusters, sub ward and ward level through the community development committees.

Climate change committees; they exist at different levels and structure with the lowest being the ward level (ward climate change planning committees) which focuses on developing and implementing climate change mitigation and adaptation plans at the ward level, tailored to the specific needs of their communities.

County WASH forums; this brings together sector players every quarter into discussions on development activities being undertaken. The sector players take time to pause, reflect and engage on implementation progress, gaps and challenges and forge way forward towards universal access to water and sanitation.

Capacity-building requirements.

The following are some of the capacity building requirements to strengthen and support multi-stakeholder coordination;

Training for county staff and technical personnel on stakeholder engagement techniques, policy and legal frameworks and digital tools and data management.

Awareness and advocacy skills training among community based and local organizations will enhance their ability to advocate effectively, compile community needs and engage confidently in county-level dialogues.

7.1.3 Timeline for implementation, including short-term, medium-term, and long-term milestones

Timelines are essential for strategic implementation, providing a structured framework to achieve development goals. In the water, sanitation, and hygiene (WASH) sector, timelines define the scope and pace of investments, capacity building, and infrastructure delivery, ensuring efficient, equitable, and sustainable access to services. By organizing activities into short-term (1–2 years), medium-term (3–4 years), and long-term (5–6 years) phases, effective coordination with funding cycles, sector plans, climate commitments, and socio-economic priorities is enhanced.

The Makueni County Water and Sanitation Strategy and Investment Plan provides a phased implementation timeline that aligns with the National WASH Strategic Framework, Kenya Water Sector Investment Plan, 2023-27 County Integrated Development Plan (CIDP III) and the Makueni County Vision 2025. The plan prioritizes immediate interventions in the short term while progressively transitioning towards climate-resilient, cost-effective, and transformative WASH systems in the medium and long terms. This phased approach also encourages the integration of multisectoral strategies, promotes gender equity, and aligns with climate resilience objectives.

Implementation timelines consider local contextual factors, such as resource availability, institutional readiness, geographic disparities, and socio-cultural dynamics. Given Makueni County's vulnerability to climate shocks—such as floods and droughts this strategy incorporates adaptive timelines that respond to emerging needs and support from development partners. These timelines are designed to align with national funding strategies, including K-WASH and the Water Sector Trust Fund, and facilitate effective progress monitoring through performance benchmarks.

The strategy utilizes a rolling implementation model with quarterly and annual reviews to incorporate new data, stakeholders' feedback, and opportunities for scaling innovations. Each phase will be anchored in robust stakeholder coordination platforms and supported by performance contracts for relevant departments and agencies to meet their targets. This participatory planning model will ensure that community structures play a significant role in setting priorities and providing feedback during implementation.

The following is a detailed implementation schedule and performance benchmarking system, tailored to meet the evolving needs of Makueni County.

Clear implementation schedule.

The short-term phase (2023/24–2024/25). This phase involves formulating the plan and collecting baseline data to report on WASH activities in the county. The primary output is a baseline survey report for these activities, along with the approved Makueni County Water and Sanitation Strategy and Investment Plan. During this phase, a few WASH programs and projects will be implemented with funding from both the county budget and development partners. The key activities to be implemented include

The **medium-term phase (2025/26–2027/28)** focuses on advancing infrastructure development and systems integration. This is the primary implementation stage of the plan, during which w the following outcomes and key outputs will be achieved:

a) The Proportion of HH accessing safe water will increase from 44.2% in 2023 to 72% by June 2028.

b) The average distance to the nearest water source will reduce from 5 kms in 2023 to 2 kms by June 2028.

c) The proportion of schools with required sanitation & hygiene standards will have reached 50% by June 2028.

d) A total of 3,500 villages will have been declared ODF

e) A total of 60,000 community awareness campaigns will have been conducted on WASH activities.

The key projects to be implemented will Proposed construction of Muooni mega dam, Feasibility study, design, construction and distribution of Kiia Nzou concrete dam water pipeline, distribution of Athi - Kalawa Water supply project, Proposed Nunguni Water Supply Project-Construction of dam across river Inyonywe, Intake works, pumping system, treatment & distribution among other projects. The key focus will involve distribution of last mile water projects with a keen focus of constructing 350kms of water pipeline and distributing water to at least 500 households per ward annually. Cumulatively, more than 1000 Kms of new pipeline will be laid enabling access to water within 2kms to a total of 45,000 households.

The **long-term phase (2028/29–2030/31)** emphasizes sustainability, innovation, and climate resilience. This stage represents a milestone in self-actualization for WASH (Water, Sanitation, and Hygiene) in the county towards achieving the key performance indicators. The main activities will concentrate on achieving Sustainable Development Goal 6, which aims to provide clean water and sanitation for all citizens. In urban sanitation, the county completes the construction of sewerage facilities in the main urban centers of Wote, Kibwezi, Makindu, Emali, Sultan Hamud, and Kikima. The county will have engaged in public-private partnerships (PPPs) for bulk water supply, and county-wide adoption of water-efficient technologies. The goal for this phase is to achieve universal access to improved WASH services in all households, health care facilities and schools. Some of the key projects to be implemented during these phase include Distribution of Thwake multi-purpose dam water to Wote town and its environs for domestic, commercial, institutional and agricultural use, Expansion of Isunguluni earth dam, Rehabilitation and enhancement of Manooni earth dam and Installation of ultrasonic smart meters to 1,500 last mile household connections, establishment of DMAs and installation of bulk smart meters among other projects.

Each phase will be supported by robust policy, financing, and institutional frameworks, including WASH acts and regulations, climate-resilient investment plans, and inter-departmental coordination units. Milestones will be monitored bi-annually and reviewed in County Sector Working Groups (SWGs) to ensure strategic alignment and timely adjustments.

Table 51: Makueni CWSSIP Implementation Schedule (2025–2030)

Phase	Timeframe	Key Milestones	Target Beneficiaries	Estimated Budget (KES)
Short-Term	2023/24–2024/25	Water and sanitation infrastructure development and phase II of last mile water connectivity programme	45,000 households	1,510,744,911
Medium-Term	2025/26–2027/28	Construction of two mega dams pumping system, treatment & distribution of water from the mega dams and medium sized dams in the county and construction of sewerage plants in the urban areas	128,418 households	16,630,454,900
Long-Term	2028/29–2030/31	Urban water expansion, sludge units, sand dams, sanitation facilities and campaigns, PPP water systems, universal WASH in institutions and households	70,157 households	2,033,131,300

Performance benchmarks.

Performance benchmarks serve as essential indicators for assessing the effectiveness of strategies over time. They ensure that implementation is data-driven, results-oriented, and accountable to both the

public and development partners. The County has developed a performance framework that incorporates indicators aligned with Sustainable Development Goal 6 (SDG 6), K-WASH minimum service levels, and national performance standards established by the Water Services Regulatory Board (WASREB).

A key benchmark is the **increase in the population with access to safely managed water services,** projected to rise from 50% in 2024 to 75% by 2030. The Average distance (kms) to the nearest water source is projected to decrease from 4kms in 2024 to 1.6Kms by 2030. These two indicators aimed at Increased access to improved water sources will be monitored through periodic household surveys, administrative records, and GIS water point mapping. Additionally, the Proportion of schools with required sanitation & hygiene standard will increase from 30% to 65% within the same timeframe while the No. of villages declared ODF will increase from 1449 in 2024 to 4500 in 2030.

For institutional performance, a critical benchmark is the proportion of water service providers meeting over 70% compliance as set out in the guidelines which will increase from 60 in 2024 to 95% by 2030.

7.2 Monitoring and Evaluation Plan

The Monitoring and Evaluation (M&E) system aims to provide information on progress, challenges, lessons learned, and emerging issues in the implementation of plans. It ensures that critical data for the systematic and continuous assessment of programmes and projects implementation, performance, and progress towards established objectives is routinely collected, analyzed, and reported. The M&E process helps identify and address implementation gaps, informs key stakeholders about program and project activities, and evaluates the achievement of development targets outlined in the plan. This enables effective, evidence-based decision-making that supports county goals and aspirations.

The Makueni County Water Supply and Sanitation Strategy & Investment Plan (CWSSIP) will adopt the existing M& E indicators outlined in the 2023-27 CIDP. This will involve monitoring key water, sanitation and hygiene output and outcome indicators indicated in the Plan. The M&E system guided by the County Integrated Monitoring and Evaluation System(CIMES) guidelines and the Makueni Monitoring and Evaluation Policy, 2021. These documents provide the framework and institutional arrangements necessary for effective performance reporting and learning.

7.2.1 Framework for tracking progress against strategic objectives

The Department of Water, Sanitation and Irrigation will coordinate the implementation of the Makueni County Water Supply and Sanitation Strategy & Investment Plan (CWSSIP) in collaboration with the Department of Health Services. The CIMES guidelines and the Makueni County Monitoring and Evaluation Policy of 2021 define the key institutions involved in the county's M&E structure, which include the following:

Table 52: M&E framework for tracking progress

No	Committee/coordination structure	Key actors in relation to CWSSIP	Duties and Responsibilities
1.	Monitoring and Evaluation Directorate based in the Department of Finance and Socio-Economic	Director M&E County M&E officers	Coordinating the M&E function throughout the county
2.	County Monitoring and Evaluation Committee (CoMEC)	County directors responsible for water and sanitation, irrigation, public health functions.	Providing quality data for decision-making, leading and directing county M&E initiatives, overseeing overall compliance, and analyzing the results of program and project implementation
3.	Sector Monitoring and Evaluation Committees (SMEC)	Directors economists and M&E officers in the county sectors responsible for County water and health departments	Developing sector indicators, conduct monitoring and evaluations, and prepare Sector M&E reports for the relevant authorities
4.	Sub-County Monitoring and Evaluation Committee (SCoMEC),	Sub county water and sanitation engineers Sub county public health officers Sub county ECDE officers Sub county director of education	Preparing M&E reports at the sub-county level
5.	Ward Monitoring and Evaluation Committee (WMEC),	Ward water officers Ward public health officers Community health promoters Water & sanitation Sector representative at the ward level	Preparing M&E reports at the ward level.
6.	Sub ward development committee members	Community health promoters and Water & sanitation Sector at the sub ward level	a) Preparing WASH M&E reports at the sub ward level. b) Overseeing implementation of WASH Projects at the sub ward level
7.	Cluster development committee members	Community health promoters and Water & sanitation Sector at the cluster level	a) Preparing WASH M&E reports at the cluster level. b) Overseeing implementation of WASH Projects at the cluster level

The Makueni County Public Participation Policy 2021 establishes development committees at multiple levels within the devolved governance system. This structure consists of 396 clusters, 60 sub-wards, and 30 wards, with representation from the water and environment sector, as well as community health promoters. The policy requires that each Project Management Committee (PMC) includes at least two

representatives from these development committees. As a result, the development committees at the cluster, sub-ward, and ward levels will prepare monitoring and evaluation (M&E) reports, which will be reviewed and processed by the County Project Implementation Unit (PIU). The M&E officer assigned to the Community Water Supply and Sanitation Improvement Project (CWSSIP) will ensure that all committees have the capacity to effectively monitor and evaluate development outcomes and outputs. The final county-level M&E report will be published on the county website to promote transparency in the implementation of the plan. Furthermore, all projects funded under the program will be documented in the County Projects Monitoring and Tracking System, enhancing efficiency, promoting transparency, and ensuring accountability in monitoring and tracking projects within the CWSSIP.

7.2.2 Key performance indicators (KPIs) and targets for each component

Table 53: Outcome Key Performance Indicators

Outcome	Key performance indicators	Base line year	Base line value	Target								Department Responsible	Frequency of Reporting
				2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31		
Outcome 1: Increased access to improved water sources	Proportion of HH accessing improved water	2022	44%	45%	50%	60%	65%	70%	72%	74%	75%	Water, Sanitation and Irrigation	Annually
	Average distance (kms) to the nearest water source	2022	5	5	4	3	2.5	2	2	1.8	1.6	Water, Sanitation and Irrigation	Annually
Outcome 2: Strengthened Governance	Proportion of Water Service Providers Meeting over 70% Compliance as set out in the guidelines.	2022	-	50%	60%	70%	80%	90%	92%	94%	95%	Water, Sanitation and Irrigation	Annually
Improved WASH and Community Led Total sanitation (CLTS)	Proportion of schools with required sanitation & hygiene standards	2023	20%	24%	30%	35%	40%	50%	55%	60%	65%	Health Services	Annually
	No. of villages declared ODF	2025	1449	1000	1500	2000	2500	3000	3500	4000	4500	Health Services	Annually
	No. of Community awareness campaigns conducted on WASH			20,000	30,000	40,000	50,000	60,000	60,000	60,000	60,000	Health Services	Annually

Table 54:Output key performance indicators

Output	Key Output indicator	Baseline year	Baseline value	Target								Department responsible	Frequency of Reporting
				2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31		
Outcome 1: Increased access to improved water sources													
Output 1: Water Dams constructed	No. of new mega dams constructed of ≥ 200,000,000M^3 complete with treatment system, distribution and irrigation infrastructure (*Thwake Multipurpose*)	2022	0	1	-	-	-	-	-	-	-	Water, Sanitation and Irrigation	Annually
	No. of new large dams constructed of ≥ 750,000M^3 complete with treatment system, distribution and irrigation infrastructure	2022	0	2	-	2	-	-	-	-	-	Water, Sanitation and Irrigation	Annually
	No. of new medium sized dams of 500,000M^3	2022	1	1	1	2	1	1	1	1	1	Water, Sanitation and Irrigation	Annually
	No. of small dams of 50,000M^3 & < 500,000M^3 constructed/ desilting/ expansion/ rehabilitated	2022	6	15	20	30	30	30	30	30	30	Water, Sanitation and Irrigation	Annually
Output 2: Sand dams Constructed	No. of new sand dams/Weirs with Sumps constructed/ rehabilitated	2022	6	10	10	10	10	10	10	10	10	Water, Sanitation and Irrigation	Annually
Output 3: Boreholes drilled and equipped	No. of Boreholes drilled & equipped	2022	20	30	30	30	30	30	30	30	30	Water, Sanitation and Irrigation	Annually
Output 4: Water distribution	Km of water pipeline completed with water kiosk/ water points	2022	167	350	350	350	350	350	350	350	350	Water, Sanitation and Irrigation	Annually

Output	Key Output indicator	Baseline year	Baseline value	Target								Department responsible	Frequency of Reporting
				2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31		
pipeline laid completed with water kiosk													
Output 5. Water treatment systems installed	No. of water treatment systems installed in unimproved water sources (CFU, Chlorine dosing units etc.)	2022	4	1	1	1	2	1	1	1	1	Water, Sanitation and Irrigation	Annually
Output 6. Households with piped water	No. of urban households with access to piped water	2022	12,344	12,544	12,844	13,144	13,444	13,744	14,044	14,344	14,644	Water, Sanitation and Irrigation	Annually
Output 7. Urban centers connected with reliable piped water	No. of urban centers/Markets connected with reliable piped water	2022	22	40	100	160	250	300	350	400	450	Water, Sanitation and Irrigation	Annually
Output 8: Water governance enhanced	No. of Water Service Providers meeting over 70% compliance as set out in the regulators' guidelines.	2022	3	3	3	3	3	3	3	3	3	Water, Sanitation and Irrigation	Annually
	No. of community water schemes/ projects sustainability management committees' capacity built on effective water management and sustainability.	2022	-	100	160	200	250	300	350	400	450	Water, Sanitation and Irrigation	Annually
Output 10: Enhanced solid and liquid waste management	No. of solid waste value chains created and adopted	2022	0	-	1	1	-	1	1	1	1	Lands	Annually
	No. of sanitary landfills developed and Maintained	2022	0	1	-	1	-	1	1	1	1	Lands	Annually

Output	Key Output indicator	Baseline year	Baseline value	Target								Department responsible	Frequency of Reporting
				2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31		
	No. of functional waste transfer stations Established	2022	11	10	10	10	10	10	10	10	10	Lands	Annually
	No. of urban centers with sewerage and waste management plan/ design	2022	0	-	-	1	1	1	1	1	1	Lands	Annually
	No. of functional and maintained public sanitation facilities established (sewerage system/ DTF/containerized treatment)	2022	0	1	1	1	1	-	-	-	-	Water, Sanitation and Irrigation	Annually
Output 11. Irrigation schemes	No. of irrigation schemes established/ rehabilitated	2022	1	3	10	10	10	10	10	10	10	Water, Sanitation and Irrigation	Annually
	Increase in total areas put under irrigation in Ha	2022	68	72	72	72	72	72	72	72	72	Water, Sanitation and Irrigation	Annually
Programme Name: Policy, Legal and Institutional Frameworks Development													
Objective: To strengthen the sectoral policy, legal and institutional frameworks													
Outcome: Strengthened governance													
Output 12: Service delivery operations in the sector enhanced	No. of policies, legislatives and institutional frameworks developed, enacted and operationalized.	2022		5	4	2	-	-	-	-	-	Water, Sanitation and Irrigation	Annually
	No. of policies, legislatives and institutional frameworks reviewed.	2022		1	1	-	-	-	-	-	-	Water, Sanitation and Irrigation	Annually

Output	Key Output indicator	Baseline year	Baseline value	Target								Department responsible	Frequency of Reporting
				2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31		
	No. of functional institutional structures established	2022		6	5	5	5	5	5	5	5	Water, Sanitation and Irrigation	Annually

7.2.3 Roles and responsibilities for data collection, reporting, and evaluation

The County Project Implementation Unit (CPIU) will oversee the data collection necessary for preparing and submitting a draft Annual County Results Monitoring Report (CRMR). This report will adhere to the format specified in the program operations manual and will detail the results achieved by the county and water service providers (WSPs) in relation to the Program Disbursement Linked Indicators (DLIs). The roles and responsibilities for data collection are outlined below:

1. **County Executive Committee:** This committee provides strategic oversight for the entire WASH program, ensuring it aligns with the county's development agenda and priorities. The Governor chairs quarterly implementation reviews to promote political support for monitoring and evaluation (M&E) of the program.
2. **County Project Implementation Unit (CPIU):** Located within the County Department of Water, Sanitation, and Irrigation, the CPIU acts as the technical coordination body for project execution and monitoring. It manages daily program operations, consolidates reports from wards and sub-counties, and submits these reports to the National Project Implementation Unit (NPIU).
3. **National Project Implementation Unit (NPIU):** Situated within the Ministry of Water, Sanitation, and Irrigation, the NPIU provides national oversight, ensures compliance with World Bank guidelines, and offers technical support to CPIUs.
4. **County Monitoring and Evaluation Directorate:** This directorate, part of the County Department of Finance and Socio-Economic Planning, ensures compliance with the county M&E framework. It leads planning efforts, develops tools, and builds capacity across departments.
5. **Department of Water, Sanitation, and Irrigation:** This department coordinates all technical aspects of water project implementation and M&E, working closely with water service providers (WSPs), development partners such as NGOs, community-based organizations (CBOs), civil society organizations (CSOs), faith-based organizations (FBOs), and local WASH committees.
6. **Department of Health Services:** This department monitors health outcomes associated with WASH, including sanitation and hygiene services in public health facilities like schools, hospitals, and markets.
7. **Ward, Sub-Ward, and Cluster M&E Committees:** These grassroots structures are responsible for real-time data collection, gathering beneficiary feedback, and reporting using standardized data collection tools.
8. **Local Development Partners (e.g., NGOs, CBOs, CSOs, and FBOs):** These organizations participate in the implementation of WASH programs and activities, providing independent assessments and assisting with data collection and analysis to evaluate program implementation.
9. **Private Sector Actors:** These entities participate in third-party verification and performance contracting processes.

10. **National and International Development Partners:** These partners, including the World Bank, UN agencies, TIKA, and the Water Sector Trust Fund, support capacity building, financing, and technical assistance for the M&E of project implementation.

7.3 Communication and Advocacy Plan

A comprehensive communication and advocacy plan, establishes a structured approach to communication and advocacy with the goal of influencing policy, mobilizing resources, raising awareness, influencing policy and driving behavior change among diverse stakeholders.

The communication plan for the CWSSIP, is to utilize a three pronged strategy that aims to influence communication process at three levels, that is, Advocacy, Social mobilization and Programme communication.

7.3.1 Strategies for stakeholder engagement and public awareness

Stakeholder engagement and public awareness will be achieved through inclusive communication approaches designed to strengthen both stakeholder engagement and public awareness.

The ultimate strategy will involve stakeholder mapping and analysis based on their interests, influence and information needs. Stakeholders include government agencies, community groups of all categories (inclusive of women, youth, elderly, religious), development partners and private sector. Stakeholder mapping ensures engagement process is inclusive and that vulnerable or marginalized groups are not overlooked. In addition, it helps in tailoring communication strategies so every stakeholder feels their voice counts.

Engagement platforms will also be adopted as per the target audience, for instance, since Makueni is generally rural public barazas and community forums will be ideal in the villages. However, a blended approach would be adopted to accommodate everyone. For instance, formal channels such as the county steering committee & other WASH related adopted committees and official consultations will work well for high-level decision-makers, while community forums, workshops, and local radio discussions will be effective for grassroots audiences. In addition, digital platforms like social media and interactive websites would be effective for the youths and professionals.

Collaborative partnerships and awareness campaigns to enhance the visibility of key messages and drive sustained public engagement will be key in implementation of the CWSSIP. The county has been having monthly awareness engagements with community via local radio on various topics. This would be enhanced with emphasis on behavior change communication in regards WASH because of the wide coverage.

7.3.2 Mechanisms for information dissemination

Effective information dissemination is a cornerstone of transparent governance and community engagement.

To ensure efficiency in dissemination of information in regards to the strategy, a blend of traditional, digital and print mechanisms will be utilized together with the existing county institutionalized stakeholder and community engagement and communication mechanisms such as the county development committees. In specific the following mechanisms will be put in place:

Local radio having wide-reaching coverage, particularly in rural areas, local vernacular radio stations will be used to broadcast behavior change information. These platforms allow real-time updates and have the benefit of reaching audiences with low internet penetration. This will be done together with regular press briefings and media engagements to inform on progress, challenges and opportunities within the WASH program.

Print Media like magazines, flyers, posters and brochures remain vital for detailed reports and policy documents. Printed materials, tailored in local languages and disseminated through community forums and committees will help ensure that technical or official information is accessible to a broader audience.

The county feedback mechanisms like the county grievance redress mechanism will equally become handy in the project phase to disseminate appropriate information as and when required in all cycles and the different project levels.

7.3.3 Advocacy initiatives to secure political and financial support

Advocacy initiatives will take a multipronged approach to secure both political and financial support. These initiatives will not only target increased budgetary allocations and political commitment but also aim to create sustainable policy frameworks and accountability systems that ensure long-term funding for WASH services.

One key initiative will be documentation of policy briefs and progress reports with the aim of highlighting on the impact of underfunding in WASH and outlining the cost-effectiveness of investing in sustainable infrastructure. Engagement of media and digital platforms presence will equally be an important initiative to advocate and create an environment of informed public debate. This will be through regular press briefings, airing of success stories and impact reports as they help to maintain political momentum and financial interest in WASH.

ANNEXES

ANNEX 1: WATER SUPPLY INFRASTRUCTURE INVESTMENT PLAN

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
2025					
Mutemwa borehole	Equipping, installation of solar power and distribution of Mutemwa borehole	7,200,000	-1.849444	37.582222	3,500
Kamunyolo Earth Dam	Construction of 300m3 clear water sump	6,000,000	-1.792500	37.643333	10,000
Kaiti 1 Intake Water Project	Installation of new submersible high and low lift pumps	4,000,000	-1.772222	37.423611	10,000
Kunda kindu house hold sanitation	Construction of a decentralised treatment facility (DTF50)	12,000,000			25,000
Kaiti 2 water project	Installation of pumping system, solar power, distribution system and treatment facility	27,000,000	-1.779444	37.611667	6,000
Kitise Water Project	Solarization intake and rehabilitation of distribution line	8,600,000			6,000
Athi Mavindini water project	Solarization intake and rehabilitation of distribution line	10,500,000	-1.814167	37.862500	3,500
Kikuu Kwa Kavisi water project	Construction of 50 cubic meter reinforced concrete intake sump tank	2,000,000			2,500
Muliluni Kiambani Livelihood enhancement project	Borehole treatment and distribution to Kiambani, Kwa Mwee and Katulye	16,500,000	-2.484207	38.132784	2,700
Kwa Kakui Earth Dam	Desilting and Expansion, Protection works and treatment	16,000,000			**3,500**
Thwake water project	Sump construction, construction of 63 cubic meters storage tank	9,000,000			**2,500**
Mulima water project	Water treatment works, pumping system, installation of a rising main pipeline and distribution to Syiluni, Nthungoni, Nzeveni, and Ndoo areas	38,000,000			**39,615**
Yandia Water Project	Water distribution	13,000,000	-2.010381	37.528476	6,000
Mutyambua safe water project	Drilling, equipping, treatment, storage	20000000.00			
Kyamusoi borehole	Treatment and distribution	17,000,000			2,200
Kinze Water Project	Project solarisation & distribution to Namba Nyaanya area	9,500,000			8,228
Mang'elete borehole Drilling	Borehole Hydrological survey, acquisition of WRA permit and NEMA license, Drilling and Test pumping	3,000,000	-2.68856	38.088722	2,000

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Distribution of Ilengeni water project	intake works, treatment, storage and distribution	13,700,000	-1.985804°	37.458841°	
Mitingani Water Project	Solarization, pumping system and distribution to mitingani primary school, Ukia Junction Market, Kaseveni and Iviani	15,000,000	-1.778111°	37.513507°	3,000
Wautu Kyangati Water Project	Intake works, solarization , pumping system, distribution masonry tank	45,000,000	-1.848804°	37.392901°	4,000
Ilovoto Water Project	intake works and distribution to Mutanda, Kituiyuni, Ngilani, Kaeni, Domino and Kithangathini	25,000,000	-1.813715°	37.373465°	3,000
Aligon pumping system	project solarisation	20,000,000	-2.406381	37.928671	5,000
Ndauni Pipeline	Installation of pipeline to Iuluni, Mwanyani and rehabilitation of water kiosks in the two areas	4,500,000	-2.458915	38.05884	1,300
Kambu Kitengei Water Project	Construction of 2 water tanks at Kitengei and Kwa Muange	5,000,000	-2.566941	38.065792	6,500
Ndukuma dam water distribution	Construction of 100m3 masonry tank, solarization, pumping system, rising main and distribution lines	15,000,000	-1.880198	37.6128822	5,200
2026					
Kaiti 1 - kamunyolo -mwaani	Installation of solar power at kaiti 1, kamunyolo and upgrade mwaani booster	20,000,000	-1.772222	37.423611	
County Water Testing laboratory	Construction and equipping a County Water Testing laboratory	25,000,000			
Ndukuma earth dam water distribution	Fencing of the dam, Construction of treatment facility, construction of 2no 100m3 masonry tanks and distribution of Ndukuma earth dam water	20,000,000	-1.879722	37.613611	
Kikuu Kiangini water project	Construction of treatment facility and connection to households	15,000,000	-2.0875	37.7725	3,500
Wote town	Upgrade Wote reticulation to reduce NRW and increase supply	11,000,000	-1.783332°	37.628773°	
Kilala borehole	Drilling of Kilala borehole	5,000,000	-1.773615°	37.534127°	
Installation of solar power for Kaiti 1, Kamunyolo, Kilala and Mwaani booster upgrading	Installation of solar power for Kaiti 1, Kamunyolo, Kilala and Mwaani booster upgrading	80,000,000	-1.792528°	37.643356°	
Kikuu Kawala water project	Construction of a sump, installation of pumping system and solar power, distribution pipeline and treatment	16,000,000	-1.967222	37.570278	

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Rehabilitation of Ngwasini Concrete dam	Desilting, Check dam construction, treatment & distribution	9,000,000	-1.9674246°	37.5129438°	3,000
Rehabilitation of Kwa Nzele sand dam	Construction of sump tank, & pipeline rehabilitation	6,000,000	-2.0530789°	37.468592°	7,000
Yikivumbu Water Project	Drilling, equipping, distribution	5,000,000	-2.088003°	37.71567°	2,000
Kwa Malika Sump	Rehabilitation of sump, solarization, & distribution	5,000,000			1,000
Distribution of Katilini Earth Dam	Treatment, solarisation and distribution	30,000,000	-1.815551	37.267743	7,000
Thange Springs Integrated project	Development of intake works treatment and distribution to Thange, Kwa Ileli, St. Peter's secondary and Primary Schools	13,000,000	-2.501389	38.0225	2,485
Ulilinzi borehole	Borehole equipping, treatment and distribution	8,000,000			
Kativani Borehole	Borehole equipping, treatment and distribution	7,500,000	-2.518056	38.081944	
Kooi earth dam water project	Intake works, treatment & distribution to Imale and Tawa town areas	35,000,000			4,000
Thwake water project , Tulimani ward	Construction of a sump, solarised pumping system, water treatment and distribution to Uvaani area	10,000,000			2,500
Kinyenyoni/Syumbe borehole Kisau Kiteta ward	Borehole equipping & distribution to Syumbe area	6,500,000			2,000
Athi Kalima Koi Water Project	Construction of intake works, distribution and treatment systems	150,000,000	-2.403807	38.228729	12,000
Distribution of Nzaini Borehole	Equipping, treatment and distribution	7,000,000			4,000
Thange sand dam	Installation of treatment system, WRA permits, NEMA License and distribution	75,000	-2.480278	38.040833	1,200
Athi-Tunguni-Kilema Water Project	Water distribution	110,000,000	-2.171006°	37.966698°	10,000
Athi-Kalawa water Supply project	Treated water distribution	8,000,000			
Makaia Borehole water project	Water treatment and distribution	4,000,000			
Kambu Kiteng'ei water project	Pipeline extension and construction of water tanks	5,000,000	-2.566941	38.065792	3,500
Kwa Wala Borehole water project	Equipping, treatment and distribution	7,500,000			**3,500**

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Kinze Earth Dam Water Project, Kisau/Kiteta ward	Treatment rehabilitation & Distribution to Kitandini, Kyambusya, Mbavani, Usalala	7,000,000			1,800
Lung'u water project, Kisau Kiteta ward	Treatment & further distribution to Kavuvoni area	2,700,000			800
Mutooni borehole, Kithungo/Kitundu ward	Equipping & Distribution to Kitundu area	5,000,000			1,800
Mwenyeani water project, Kithungo/Kitundu ward	Treatment & further distribution to Mwenyeani area	6,000,000			2,500
Muliluni borehole distribution	Pipeline extension	3,500,000			1,200
Iiani sand dam water project, Tulimani ward	Sump equipping, treatment & distribution	4,000,000			2,000
Athi Mavindini water project	Distribution	10,000,000	-1.814167	37.862500	4,500
KIBMAWASCO Pipelines Augumentation	Construction of 225 cubic meter water tanks at Ithumula, Kisaayani, and Ndetani CTTI and last mile connectivity in Ilingoni	20,500,000	-2.318592°	38.071898°	700
Kitise water project	Storage tank, distribution	7,000,000			**6,000**
Proposed Nunguni Water Supply Project	Feasibility Study and Construction of dam across river Inyonywe	100,000,000	-1.790109°	37.361291°	4,000
Development Kwa Kawawa BH and Water Distribution Project	High water producing BH development, Equipping and distribution	90,000,000	-2.265682°	37.892054°	
Kilombo Water Project	Intake works, Solarization and pumping system	10,000,000	-1.754202°	37.296949°	3,000
Kwa Venge Water Project	Solarization of the pumping system	20,000,000	-2.303628°	37.797458°	5,000
Installation of ultrasonic smart meters to 1,500 last mile household connections. Establishment of DMAs and installation of bulk smart meters.	Purchase of ultrasonic smart meters and bulk water meters to improve metering efficiency through sending real time data on water usage and billing to reduce NRW.	25,000,000	-2.273117	37.824433°	1,500
Wote town	Automation for 24 hrs water supply, minimise wage bill, improve revenue efficiency and minimise NRW	25,000,000	-2.273117	37.824433°	6,000

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Manooni earth dam	Desilting of Manooni dam, abstraction works, distribution pipeline, construction of storage tanks, construction of water point	44,000,000	-1.951389	37.470556	9,800
Upgrading of old dilapidated rising and distribution water pipeline systems	Rehabilitation of old dilapidated rising and distribution pipeline systems of various sizes ranging from 12" to 2"	50,000,000	-2.408199°	37.961730°	8,000
Construction of 10No. water storage/distribution tanks along the pipelines.	Construction of water storage/distribution tanks along the pipelines of various capacities ranging from 50m3,100m3,150m3 to 200m3	20,000,000	-2.408199°	37.961730°	1,000
Katilini Earth Dam Water Project	Water Treatment & Distribution its Salama and surrounding areas	24,230,000	-1.815551	37.267743	
Kyala Earth Dam Water Project	Installation of solar powered pumping system, construction of rising main, construction of water tank platform and installation of plastic water tanks, and construction of distribution pipeline to Kyala area	15,000,000			3,650
Ngakaa-Muooni Integrated Project	Construction drift, sump, pumping system and distribution to Itulani area	15,000,000			
Mweini dam project	Construction of dam and water distribution to Mweini area	13,738,597			
Kwa Kitungu Water Project	Equipping, installation of solar and distribution of Kitungo sand dam	10,000,000			
Kaiti 2 Intake	Construction of a new sump tank and construction of a latrine at Kaiti 2	5,000,000			
Kinze Water Project/Mbumbuni Scheme	Rehabilitation of Namba Nyaanya return pipe, construction of a water kiosk and valve chambers	5,770,750			2,628
GFBC-Kithongo -Kivani pipeline	Construction of Pipeline from Mbumbuni to Kithongo and kivani/Mukumwani, rehabilitation of water kiosks, installation of plastic water tanks and construction of platforms and valve chamber	2,500,000			4,734
NRW - Management	Installation of master meters, installation of customer meters, creation of DMAs.	4,980,070			43,186
MBONWASCO - Water quality control	Installation of FRO dozer, Installation of solution tanks, supply of water testing kits and tablets, supply of water treatment chemicals	295,255			43,186

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Mang'elete borehole	Solar power equipping and distribution of water to Ivingoni, Uiini, Syandani, Nzayo, Muthaiga, Daru, Miangeni and Kathekani	3,000,000	-1.773615°		
Mwaani B/H 4	Install a pump and 2km raising main to mwaani booster	6,000,000			
Kilala borehole	Solarisation, equipping and distribution	5,000,000			
Manguluku dam	Construction of 150 cubic meter dam, treatment and distribution to surrounding area and Kambu town	75,000,000	-2.613372	38.083391	5,500
Ngosini earth dam	Desilting of the dam, water treatment and distribution	50,000,000			
2027					
Kaiti I Intake	Supply submersible pump and rehabilitate the rising main	9,500,000	-1.772222	37.423611	15,000
Kwa Kitungu sand water project	Further distribution to Watuka and Wote town, distribution of Kwa Kitungu sand dam	50,000,000	-1.761667	37.635278	5,400
Construction of storage tanks for Wote water	Construction of 3 No elevated storage tanks	20,000,000	1.783333	37.628611	7,000
Kyamakuthi Earth dam water project	Sump construction, Treatment ,Solarised pumping system and Distribution	50,000,000	-1.687352°	37.723845°	
Kikumini borehole	Treatment, addition of 2no 100 cubic meters storage tank and distribution	10,000,000			2,500
Thwake Water Project	Water distribution to Kwa Kathoka	7,000,000			2,500
Distribution of Ndukuma earth dam	Water distribution	10,000,000	-1.879722	37.613611	6,000
Athi-Thunguni-Kilema Water Project	Water distribution to Kilema, Syumile and Makindu areas	70,000,000	-2.171006°	37.966698°	10,000
Athi Mavindini water project	Water distribution to the surrounding areas	10,000,000			4,500
Distribution of Katilini Earth Dam	Water distribution to Salama town, Mwanyani, Kwa DC and parts of Mukaa ward	10,000,000			2,500
Kwa Wala Borehole	Treatment and pipeline extension to the surrounding area	7,000,000			2,500
Muooni Mega Dam	74M Cubic Rock fill dam, treatment & distribution to Emali & Nguu wards	7,500,000,000	-2.41334°	37.293281°	100,000
Expansion of kwa Maima Earth dam	Dam reservoir expansion, water treatment, distribution	7,000,000	-2.0426712°	37.5434655°	25,000

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Kikuu-Katangini water project	Sump and weir construction, water treatment, solar powered system and distribution	12,000,000	-1.747282°	37.704451°	
Mbyani water project, Kithungo Kitundu	Water distribution to Mbanya and surrounding areas	6,000,000			2,000
Kakili Borehole Project	Equipping, Water Treatment, & distribution to Kakili areas	12,000,000	-2.036083°	37.606034°	3,600
Kimia Kateiko Water Project	Treatment & distribution to the surrounding area	10,000,000	-1.985542°	37.576141°	4,000
Yavoo water project, Kithungo Kitundu ward	Water treatment & distribution to Yavoo area	5,000,000			1,500
Ikokani water project, Tulimani ward	Water treatment & further distribution to Ikokani area	7,000,000			1,500
Ngoni earth dam water project , Kisau Kiteta ward	Water treatment, solar powered system and distribution to Ngoni area	15,000,000			3,000
Kyaluma Thwake sump construction and distribution project	Sump and weir construction, water treatment, solar powered system and distribution	50,000,000	-1.639968°	37.657120°	
Athi -Kalawa Water supply project	Distribution of treated water to Kalawa ward	100,000,000	-1.634105°	37.734078°	
Kwa Mbila water project	treatment and distribution to Kathonzweni and Kithuki areas	10,000,000			2,500
Matinga water project	treatment and distribution the surrounding areas	15,000,000			3,000
Kithuki water project	treatment and distribution to Kithuki area	15,000,000	-2.45516	38.212769	1,500
Expansion of UYI earth dam	Construction of 150,000 cubic meter earth dam, treatment and distribution to Kithiiani, Utini areas	25,000,000	-2.45516	38.212769	3,000
proposed Kiia Nzou Water Project	Feasibility study and Construction of dam	2,500,000,000	-1.735969°	37.353091°	100,000
Proposed Nunguni Water Supply Project	Intake works, pumping system, treatment & distribution	60,000,000	-1.790109°	37.361291°	25,000
Ukia Borehole	solarization , equipping and distribution to schools and dispensary	5,000,000	-1.760236°	37.500241°	5,000
Kilombo Water Project	Treatment works and distribution network to kasunguni, mutulani and nguluni	50,000,000	-1.754202°	37.296949°	25,000

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Ndiani Water Project	Treatment and distribution network extension katulye, utumo umo, kyekolo,kitituni	10,000,000	-1.777355°	37.387922°	6,000
Kivani Earth dam	Desilting reservoir	50,000,000	-1.720515°	37.368438°	10,000
Kwa Kisela Water Project	rehabilitation of rising main and distribution extension to mukuyu	5,000,000	-1.738608°	37.456311°	7,000
Ngitini Water Project	Upgrading solar power supply system and pumping system	4,000,000	-1.717021°	37.360211°	5,000
Kambu Springs	Solar power installation	20,000,000	-2.568489°	38.066584°	5,000
KIBMAWASCO Pipelines Augmentation	Purchase of ultrasonic smart meters and bulk water meters to improve metering efficiency through sending real time data on water usage and billing to reduce NRW, Automation for 24 hrs water supply, minimise wage bill, improve revenue efficiency and minimise NRW and Rehabilitation of old dilapidated rising and distribution pipeline systems of various sizes ranging from 12" to 2"	100,000,000	-2.273117	37.824433°	
KIBMAWASCO Water tanks construction	Construction of water storage/distribution tanks along the pipelines of various capacities ranging from 50m3,100m3,150m3 to 200m3	20,000,000	-2.408199°	37.961730°	
Wote green energy (Wote water supply)	NRW and Service Delivery Auxiliary Strengthening Investments	60,000,000			
Drilling of 15 boreholes in Kibwezi area	Hydrological Survey, Acquisition of NEMA License and WRA permits, borehole drilling, equipping with solar power, distribution with water points and water tanks	75,000,000			
Kiia Nzou dam project	Feasibility study and Construction of dam	1,500,000,000			
Kisau Girls-Ngoluni-Kyangondu pipeline	Pipeline extension from Kisau Girls to Ngoluni market and Kyangondu market, construction of water kiosk, installation of plastic water tanks	1,971,584			8,775
Ngaa Market water project	Construction of pipeline from Kiambwa tank , Construction of masonry water tank 100m3 , construction of valve chamber.	2,500,000			9,376
Mukundi pipeline extension-Phase 1	Construction of Kitondo pipeline, construction of valve chambers, installation of valves.	2,000,000			2,473

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Construction of DTF 50m3/day	Construction of DTF at Kikima, Construction of sanitation facilities (Pour flash and flash toilets)	25,000,000			10,000
MBONWASCO ERP system	Procurement and installation of ERP system comprising of billing, accounting, human resource, procurement and customer care. The system will be procured and installed in MBONWASCO's offices and manned by Mbonwasco staff. Billing, accounting, human resource and customer care systems are manual, slow and subject to manipulation. This project is aimed at increasing accuracy and efficiency of the WSP data, operations and strengthening internal controls.	16,000,000			43,186
Ilingoni Earth dam	Construction of an earth dam, excavations of reservoir area and spillway construction, Check dams, Road works (drift and earthen raising of the road section), Water treatment and distribution, Fencing and auxiliary works	100,000,000	-2.330663°	37.928521°	12,000
Mitingani water project	Treatment works	15,000,000	1.778111	37.513507	3,000
Wautu Kyangati Water Project	Treatment works	15,000,000	1.848804	37.392901	5,000
KIBMAWASCO Water tanks construction	Construction of water storage/distribution tanks along the pipelines of various capacities ranging from 50m3, 100m3, 150m3 to 200m3	20,000,000	-2.408199°	37.961730°	10,000
2028					
Expansion of Isunguluni earth dam	Acquisition of NEMA license and WRA permits, expansion of earth dam and rising of embankment, construction of spill way, treatment and pipeline installation with water tanks and water points	55,000,000			4,700
Construction of Kambu sand dam	Acquisition of NEMA license and WRA permits, construction of sand dam, intake sump, solar pumping system, pipeline distribution with water point and water tanks	35,000,000			3,500
Construction of treatment of facility and connection to households for Kitungu sand dam	Construction of treatment of facility and connection to households for Kitungu sand dam	25,000,000	-1.761667	37.635278	5,400

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Wote Water Improvement	Incorporating smart metering to improve water distribution efficiency and prevent wastage	8,000,000	1.783333	37.628611	51,000
Athi-Thunguni-Kilema Water Project	Water distribution to Nguumo areas	50,000,000	-2.246933°	37.920723°	10,000
Thwake multi-purpose dam	Distribution of Thwake multi-purpose dam water to Wote town and its environs for domestic, commercial, institutional and agricultural use	300,000,000	-1.789640°	37.842657°	30,000
Makindu borehole	Installation of solar power	10,000,000	-2.303628°	37.797458°	5,000
Solarization of Kilui pumping systems	Project solarisation	10,000,000	-2.391569°	37.999564°	
Manooni earth dam	Construction of water treatment works, Fencing of dam, construction of distribution pipeline and storage tanks and last mile connection	50,000,000	-1.951389	37.470556	9,800
Prefeasibility studies for Construction of Flagship earth dams	Feasibility studies for 5 earth dams – Manooni, Manguluku, Isunguluni, Kwa Mbata and Kalala earth dams	12,500,000			
Mbumbuni Market water reticulation	Rehabilitation of elevated steel tank 86m3 storage tank at Mbumbuni Market and automation of two water kiosks at Mbumbuni market.	3,210,000			10,338
Ngaa Market Pipeline - Phase 2	Complete construction of pipeline from Kiambwa to Ngaa market, Pipeline extension from Ngaa Market.	2,500,000			9,876
Mukundi pipeline extension-Phase 2	Extension of Mangani pipeline, construction of valve chambers.	2,000,000	10220S	372351E	3,435
Kaiti kwa Kitila wp	Rehabilitation of the project, treatment works and further distribution	15,000,000			
Mitingani Water Project	Distribution to yathonza and kyau	7,000,000			
Wautu Kyangai Water Project	Distribution to wautu primary school, wautu secondary school, kakindu, kyambeke market and wautu market	18,000,000			
Kiia Nzou dam project	Construction treatment works	45,000,000			
Nunguni water project	Water distribution to nunguni town, kikoko, kauti, kyale among other nunguni town environs	25,000,000	1.4809	37.2025	
KIBMAWASCO Pipelines Augmentation	Purchase of ultrasonic smart meters and bulk water meters to improve metering efficiency through sending	120,000,000	-2.273117	37.824433°	1,500

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
	real time data on water usage and billing to reduce NRW, Automation for 24 hrs water supply, minimise wage bill, improve revenue efficiency and minimise NRW and Rehabilitation of old dilapidated rising and distribution pipeline systems of various sizes ranging from 12" to 2"				
Isunguluni earth dam	Reservoir expansion, treatment and distribution to Kinyambu, Machinery and surrounding areas	85,000,000	-2.514815	38010183	4,560
Sand dams along Kambu river	Construction of 10No. sand dams and solar powered distribution along Kambu river at identified sites	200,000,000	-2.617673	38.102846	
Thange river Dam	Preliminaries, Feasibility studies, Acquisition of NEMA license and WRA permits, RAP, Earth works, treatment, water reticulation to Kalima Koi and Distribution to lower Masongaleni and Mtito Andei wards	500,000,000	-2.44928	38.099819	
Dwa Kivungoni Ulilinzi Integrated project	Preliminaries, Feasibility studies, Acquisition of NEMA license and WRA permits, Intake works, installation of 25km gravity line to Ulilinzi	60,000,000	-2.391519	37.998956	
2029					
Thwake multi-purpose dam	Distribution of Thwake multi-purpose dam water to Wote town and its environs for domestic, commercial, institutional and agricultural use	300,000,000	-1.789640°	37.842657°	30,000
Athi-Thunguni-Kilema Water Project	Water distribution	50,000,000	-2.282963°	37.955365°	10,000
New Mwaani boreholes	Drilling, equipping and installation of rising mains of 3 new Mwaani boreholes to Mwaani booster station	30,000,000			
Construction of Mbumbuni-Usalala pipeline	Pipeline extension from Mbumbuni Market to Usalala, construction and plumbing of water kiosks, installation of plastic water tanks, construction of platforms and valve chambers	3413435.00			6,050
Pipeline extension from Ngaa Market- Phase 3	Construction of pipeline, construction of water kiosks, installation of plastic water tanks, construction of water tank platforms and valve chambers.	1500000.00			9,876

Year and Project Name	Description	Capital Expenditure (Ksh)	Lat	Long	Population served
Kinze earth dam	Construction of 150m3 masonry Clear water tank and 20m3 back wash tank elevated on a steel tower..	7000000.00			10,338
Mukundi pipeline extension - Phase 3	Construction of water kiosk, extension of Ngoni pipeline.	1000000.00	-1.10220S	37.2351E	2,473
Kiia Nzou Dam project	Water distribution system to, Kee ward, Ukia ward and Wote town	500,000,000			
2030					
Distribution of Thwake multipurpose dam water to Wote town and its environs	Distribution of Thwake multipurpose dam water to Wote town and its environs for domestic, commercial, institutional and agricultural use	300,000,000	-1.789640°	37.842657°	30,000
Construction of Athi-Thunguni-Kilema Water Project	Water distribution	50,000,000	-2.282963°	37.955365°	10,000
Construction of Mukundi dam	Construction of Mukundi dam, construction of gravity intake works, Construction of Gravity main, construction of valve chambers and construction of treatment works	100,000,000	10220S	372351E	38,595
		17,346,384,691			

ANNEX 2: SANITATION AND HYGIENE SERVICES INVESTMENT PLAN

Name of Project	Description	Capital Expenditure (Ksh)	WSP
2025			
WASH Technical working group	Formation of County WASH technical working team	1,792,000	
WAS H implementation plan	Formation of county WASH implementation plan through stakeholder engagement	493,200	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities (HCFs)	7,000,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities (Schools)	1,000,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities (community level)	2,500,000	

Name of Project	Description	Capital Expenditure (Ksh)	WSP
WASH infrastructure development in healthcare facilities	Undertaking of WASH infrastructure investments in 7 HCFs	7,000,000	
WASH infrastructure development in schools	Undertaking of WASH infrastructure investments in 25 primary Schools	18,000,000	
2026			
Feasibility Study for Wote town sewerage system	Carryout feasibility studies and compliance requirements and preparation of detailed design.	10,000,000	WOWASCO
Household WASH baseline survey	To undertake County WASH baseline survey in 244,669 households.	11,379,000	
WASH training	Training of 130 PHOs and CHAs on WASH	10,080,000	
WASH infrastructure assessment needs	Identification of improved county sanitation systems	22,758,000	
WASH sensitization	Sensitization of 2700 CHPs on WASH	11,379,000	
Artisans training on WASH	Training of 180 artisans and 300 local stockists on improved sanitary facilities that are climate resilient	7,600,000	
Community sensitization on WASH	Sensitization of community members on the best WASH infrastructure model for adoption and sustainability across the entire County	113,790,000	
WASH intensification	Provision of conditional incentives to 225,045 households meeting the WASH eligibility criteria for disbursement	18,965,000	
Development of Wote town sewerage system	Construction of Wote Town sewerage system in phases	200,000,000	WOWASCO
County monitoring of improved sanitation facilities	County monitoring of improved sanitation in 242 Health facilities (HCFs)	7,000,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities in 993 Schools	25,000,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities (community level)	18,000,000	
2027			
Improved sanitation in villages	To undertake a baseline survey for village sanitation status including geo referencing villages	30,263,300	
RUSH Training	Training of 80 PHOs on the RUSH implementation protocol	1,123,400	

Name of Project	Description	Capital Expenditure (Ksh)	WSP
Rush Training	Training of 2700 CHPs on the RUSH implementation protocol	18,065,000	
Pre-triggering engagement	Holding pre triggering engagement meetings	6,496,540	
Village triggering on WASH	Triggering of 2,241 villages to achieve ODF	8,867,540	
WASH follow up activities	WASH follow up activities for 2,241 ODF claimed villages	8,867,540	
ODF villages verification	Verification of 2,241 villages claiming ODF	8,867,540	
ODF certification villages	Certification of 2,241 villages for ODF attainment	8,867,540	
WASH quality control	Quality assurance and certification of 2241 ODF villages	8,867,540	
ODF villages celebration	Celebration of 2241 Villages which have attained the ODF status	1,344,000	
WASH Baseline survey	Undertaking of WASH baseline survey for all level 2 and 3 healthcare facilities (225)	16,618,100	
Mid program monitoring and evaluation	Conducting of mid programme year evaluation report	1,580,000	
WASH Baseline survey	Undertaking of WASH baseline survey for 225 level 2 and 3 healthcare facilities	16,618,100	
Mid program monitoring and evaluation	Conducting of mid programme year evaluation report	1,580,000	
Development of Wote town sewerage system Phase 1	Construction of wastewater collection and treatment and recovery system	250,000,000	WOWASCO
WASH infrastructure development in healthcare facilities	Undertaking of WASH infrastructure investments in 7 HCFs	7,000,000	
WASH infrastructure development in schools	Undertaking of WASH infrastructure investments in 25 primary Schools	18,000,000	
2028			
Development of Wote town sewerage system Phase 2	Construction of wastewater collection and treatment and recovery system	200,000,000	WOWASCO
WASH infrastructure development in healthcare facilities	Undertaking of WASH infrastructure investments in 7 HCFs	7,000,000	
WASH infrastructure development in schools	Undertaking of WASH infrastructure investments in 25 primary Schools	18,000,000	
WASH Baseline survey	Undertaking of WASH baseline survey for 225 level 2 and 3 healthcare facilities	16,618,100	
Mid program monitoring and evaluation	Conducting of mid programme year evaluation report	1,580,000	

Name of Project	Description	Capital Expenditure (Ksh)	WSP
2029			
Development of Wote town sewerage system Phase 3	Construction of wastewater collection and treatment and recovery system	200,000,000	WOWASCO
Institutional WASH facilities	Construction of latrines, public sanitation facilities and septic tanks in health facilities	23,000,000	
ODF Village status	CLTS, Demand creation and BCC activities	111,437,000	
Waste management	Fecal sludge management	23,000,000	
Institutional WASH facilities	School WASH investments in 993 schools	79,000,000	
Institutional WASH facilities	Healthcare facilities WASH investments (Autoclave) in 1 Health facility	47,000,000	
WASH Baseline survey	Undertaking of WASH baseline survey for 225 level 2 and 3 healthcare facilities	16,618,100	
Mid program monitoring and evaluation	Conducting of mid programme year evaluation report	1,580,000	
2030			
Development of Wote town sewerage system Phase 4	Construction of wastewater collection and treatment and recovery system	100,000,000	WOWASCO
County monitoring of improved sanitation facilities	County monitoring of improved sanitation in 225 facilities (HCFs)	1,000,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities in 993Schools	2,500,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities in 2241 villages (community level)	18,000,000	
WASH Baseline survey	Undertaking of WASH baseline survey for 225 level 2 and 3 healthcare facilities	16,618,100	
Mid program monitoring and evaluation	Conducting of mid programme year evaluation report	1,580,000	
2031			
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities in 225 (HCFs)	1,000,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities in 993 Schools	2,500,000	
County monitoring of improved sanitation facilities	County monitoring of improved sanitation facilities in 2241 villages (community level)	18,000,000	

Name of Project	Description	Capital Expenditure (Ksh)	WSP
WASH Baseline survey	Undertaking of WASH baseline survey for all level 2 and 3 healthcare facilities	16,618,100	
Mid program monitoring and evaluation	Conducting of mid programme year evaluation report	1,580,000	
		1,830,991,740	