



Climate Risk Assessment: Kericho Water and Sanitation Company (KEWASCO)



Purpose & Scope

This climate risk assessment is prepared for **KEWASCO** as part of the Water Resilience Solutions Hub (WRSH), a facilitated collaboration platform connecting Kenyan and Ugandan water utilities with WASH innovations to build climate resilience. Its purpose is to translate the utility's operational experience of climate-related stress into a structured overview. This is meant to ground the subsequent enterprise matchmaking and co-design phase in prioritized challenges and potential entry points that build on the realities of the WSP.

The assessment is limited to KEWASCO's own service area, assets and operations within the current planning horizon, and draws on operational data, staff input and site observations rather than a full engineering or hydrological study. The scope covers the utility's operational exposure to climate challenges, distinguishing climate symptoms from root causes to provide pointers towards potential types of solutions. Based on the engagement with the WSP it further identifies entry points for short and longer-term mitigation options and potential for collaboration with WASH enterprises and innovators.



PPC under the WRSH

The WRSH seeks to foster Public Private Collaboration (PPC) that goes beyond conventional infrastructure contracting. We are not seeking one-off arrangements in which a private company builds or installs infrastructure, is paid, and the engagement ends there. Instead, we are interested in longer-term collaborations in which WASH enterprises take on an ongoing operational role, assuming delegated responsibility for specific tasks or service areas that currently sit with the utility. What unites these models is that the **enterprise takes on genuine, ongoing operational responsibility, relieving the utility of specific recurring burdens while directly addressing one of its priority climate challenges**. The utility retains overall ownership and oversight, while the private partner brings specialized capacity, technology, or financing to sustain performance over time, rather than delivering a fixed asset and stepping away.

Concretely, this could take a variety of forms depending on a utility's needs and priorities like the following examples:

- Wastewater treatment could be offered as a service, with an enterprise designing, financing, and operating a treatment facility and being paid for the treatment delivered. This would spare the utility the upfront capital outlay for the plant and the need to build and maintain in-house wastewater treatment expertise, while still securing reliable treatment performance and treated wastewater as an alternative water source to reduce pressure on water supply.
- Pressure or water quality monitoring could be handled through an enterprise's own sensor and data systems, deployed and maintained at the enterprise's expense, while the utility would commit to paying for water quality data. Like this the utility avoids the upfront investment in monitoring equipment, does not need to establish its own procedures and staffing for pressure or quality management, and instead reliably receives the data it needs to monitor pressure surges or declines in water quality to respond to emerging challenges and builds more resilient management of its network.
- A specific network section or district metered area that is exposed to specific climate challenges (land slides, flooding / pressure surges or limited water supply) could be placed under a performance based contract or delegated management, with an enterprise taking on day-to-day operational responsibility for that zone (covering, for instance, non-revenue water reduction, meter management, or preventive maintenance) so the utility is relieved of an operational burden in that zone without having to expand its own establishment, while benefiting from an operator whose performance incentives are aligned with keeping that section running well.

System & Setting



SOURCING

KEWASCO operates a mix of larger urban systems and smaller rural schemes, predominantly supplied from rivers. Key systems include Kimugu, Timbilil, Kipkelion and Londiani, with significant differences in capacity and source reliability.

Extreme rainfall is a major operational challenge. Heavy rains increase river flows, turbidity and siltation, affecting intakes and raw-water infrastructure. Kipkelion has been non-operational for around three years following flood damage and complete silt blockage of its 5 km raw-water main and is currently under rehabilitation. Londiani has also experienced flood and siltation damage.

Dry-season source availability is significant in some schemes. Timbilil production can fall by around 78%, requiring transfer pumping from Kimugu, while Londiani's intake can fall to near zero for around two months, reducing pumping to around twice per week.

The network combines ageing infrastructure with ongoing expansion. Around 22,500 of 36,000 registered connections are active, while a 5 km / ~7,000-connection extension in Bureti is planned.

WSP INTRODUCTION

- Kericho County, Kenya
- Service: ~200,000 people served; ~37% water coverage
- Urban and rural schemes across 6 sub-counties
- Connections: ~22,500 active vs ~36,000 registered
- Revenue: KES 29M/month
- Tariff: KES 85 (raised in June 26)



TREATMENT & WATER QUALITY

KEWASCO operates several treatment plants, including Kimugu (~13,000 m³/day), Timbilil (up to ~10,000 m³/day), Kipkelion (1,200 m³/day) and Londiani (780 m³/day). Actual output varies significantly with source availability; Timbilil can fall to around 1,000 m³/day in the dry season, while Londiani currently produces around 300 m³/day

All schemes provide full treatment except Londiani, where treatment is only partial. Timbilil has an in-house laboratory, but treatment remains largely manual and there is no online water-quality monitoring.

During the rainy season, raw-water turbidity at Timbilil rises from around 23 NTU to 600–1,200 NTU, increasing treatment and flushing requirements. High sediment loads also cause siltation of intakes and raw-water mains, particularly at Kipkelion and Londiani.

STORAGE, PUMPING & ENERGY

KEWASCO has insufficient raw water storage for 24-hour supply. A proposed 1.4 million m³ dam is at pre-feasibility stage and would strengthen dry-season source security.

KEWASCO operates three pumping schemes. Londiani is fully pumped, while Timbilil is largely gravity-fed but requires additional transfer pumping from Kimugu during dry periods. Energy costs are around KES 200,000/month each for Londiani and Timbilil. The last energy audit was conducted in 2021.



NRW

NRW is approximately 53%, with particularly high losses in Kericho town, where parts of the network are up to around 60 years old. GIS mapping remains incomplete, particularly for older network sections. KEWASCO cannot yet reliably separate physical and commercial losses, while incomplete production metering leaves some losses between abstraction, treatment and distribution unknown.

The network is structured into 23 main DMAs and sub-DMAs. A Gatsby pilot reduced NRW from around 70% to 43% in a small DMA, while connections increased from around 200 to 370. Replication in a larger DMA was less successful because extensive pipeline rehabilitation was required.

KEWASCO is now testing smart consumer and bulk metering and has introduced a new ERP. However, GIS, billing and operational data are not yet fully integrated, and gaps remain in pressure management, tank and overflow monitoring, and real-time network visibility.



SANITATION

KEWASCO operates a 660 m³/day wastewater treatment plant in Kericho, currently being expanded to 3,500 m³/day. Sewerage coverage remains limited at around 6,000 connections, with ~1,200 additional plot connections planned. Three utility exhauster trucks operate alongside private emptiers.

Faecal sludge is dried and reused in agriculture. A 2023 pre-feasibility study found briquette production feasible, but full feasibility has not yet been completed; biogas is also under consideration.

Climate Context

Kericho has a highly variable rainfall regime, with strong shifts between wet periods and dry spells. The 2024 long rains were above normal across the western highlands, while most of Kericho received only around 60–80% of normal rainfall during OND 2025, with significant dry spells. Heavy rainfall returned in early 2026. The historical data above show this variability clearly: extreme 5-day rainfall fluctuates strongly between years.

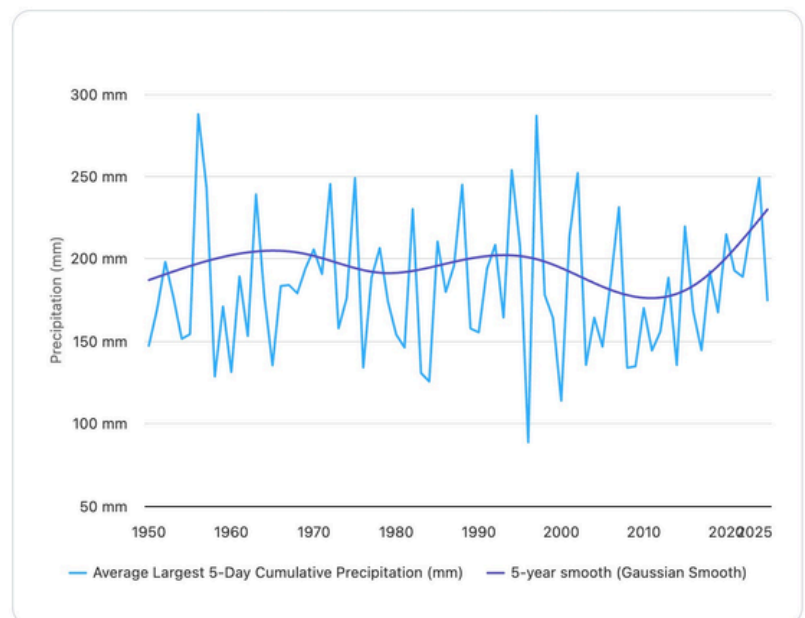
Climate projections indicate increasing heat and longer warm periods, as shown in the lower graph, while rainfall variability and intense rainfall events remain important risks. Kericho’s climate assessments also identify prolonged dry spells, floods, erosion and landslides as key hazards. For KEWASCO, this means continued exposure to both heavy-rainfall impacts, including turbidity, siltation, flooding and infrastructure damage , and periods of reduced river availability, particularly for more vulnerable schemes.

Sources:

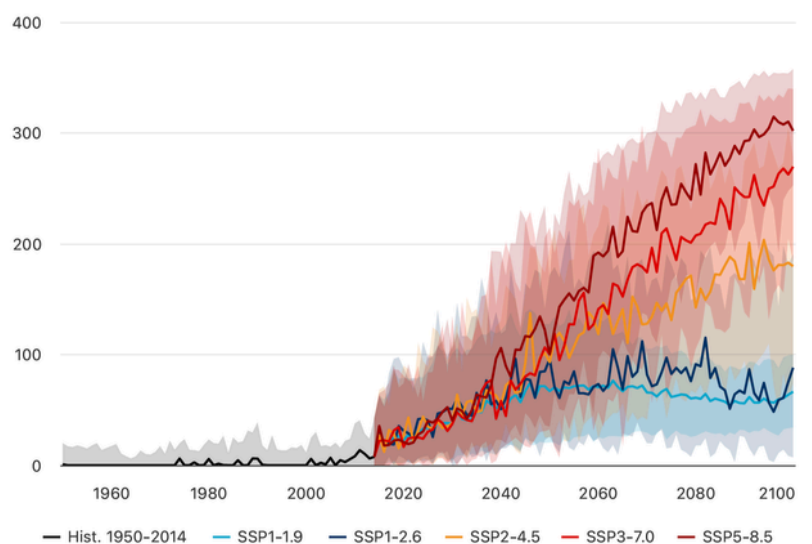
- Kericho County Government (2023). *Participatory Climate Risk Assessment (PCRA)*.
- Kenya Meteorological Department (2025). *State of the Climate in Kenya 2024*.
- Kenya Meteorological Department (2025/26). *Kericho County seasonal and weekly climate bulletins*.
- World Bank (2026). *Climate Change Knowledge Portal: Kenya – Climate Data Projections*. World Bank Group.

Observed Timeseries of Annual Average Largest 5-Day Cumulative Precipitation

Kericho, Kenya • 1950–2025



Climatology of Warm Spell Duration Index



Assessment Summary

KEY CLIMATE RISKS

Five main climate risk candidates were prioritized for KEWASCO ahead and during the site visits:

- extreme rainfall, high turbidity & siltation affecting treatment,
- dry-season source decline, particularly at Timbilil and Londiani,
- high NRW, pressure & ageing network infrastructure
- pumping, energy & limited storage capacity, increasing the cost and vulnerability of supply
- rainy-season wastewater overload & limited sanitation capacity.

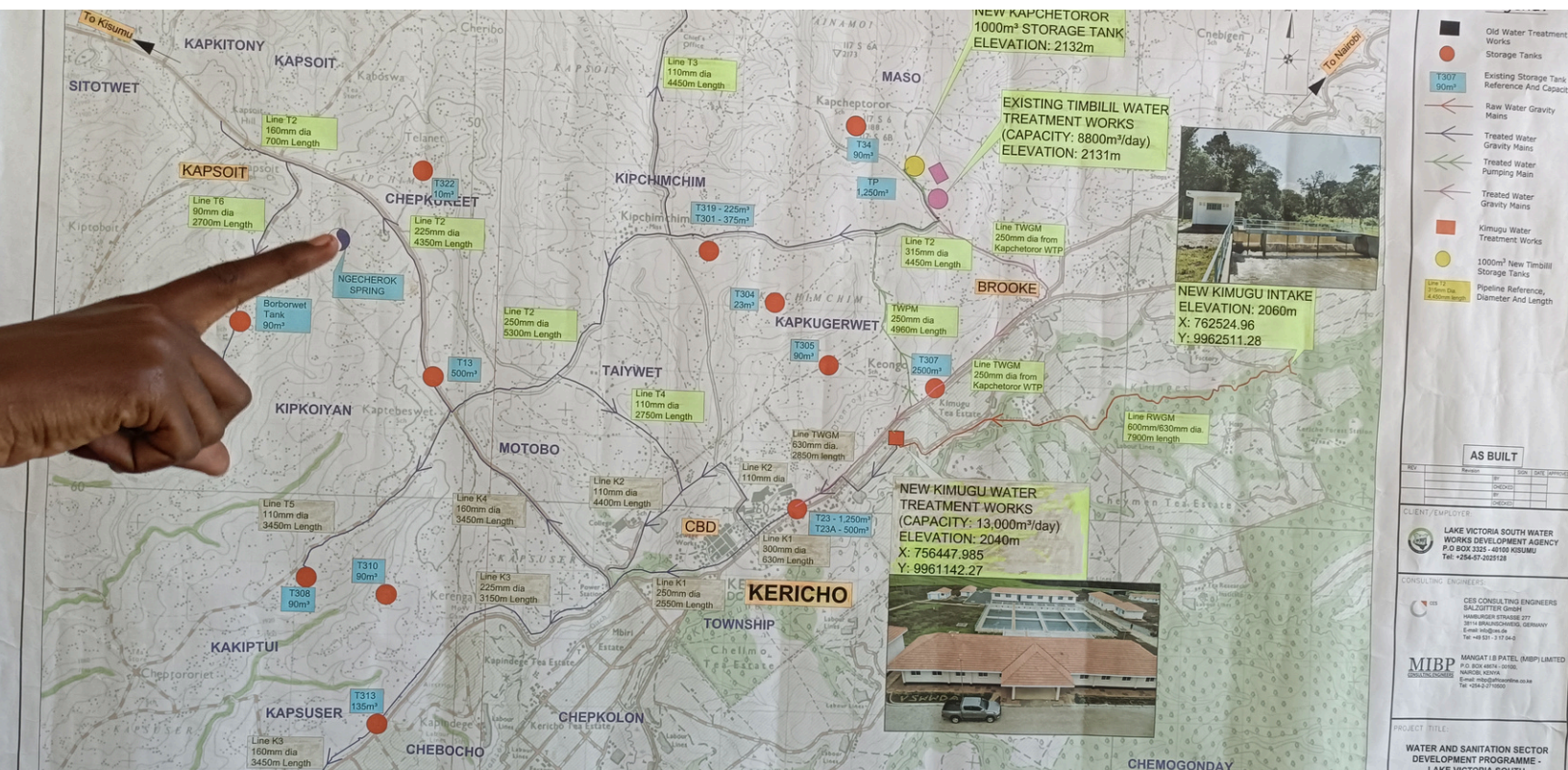
Each is addressed in its own section on the following pages.

POTENTIAL ENTRY POINTS

Around the risk various potential entry points for PPC were identified, which are described in the following risk sections:

- performance-based NRW, metering & DMA management
- real-time source, water-quality & network monitoring
- treatment optimisation & automated dosing
- wastewater/FSM operations & resource recovery

These entry points are indicative, not meant to be exhaustive and enterprises are encouraged to propose other collaborative solutions.





Extreme Rainfall & Treatment Stress

600–1,200 NTU	~20'000m ³ / day	~1 Mio KES	~15,000 people
rainy-season turbidity at Timbilil	average production across all treatment plants	monthly treatment costs (1/3 energy and 2/3 chemicals)	normally served by currently disrupted Kipkelion scheme

Treatment performance is highly exposed to raw-water conditions. At Timbilil, turbidity increases from around 23 NTU in the dry season to 600–1,200 NTU during rains. Treatment is largely manual, using jar testing and dosing with alum and soda ash, with additional backwashing and flushing during high-turbidity periods.

Monitoring and treatment control remain largely manual and there are no online raw-water quality sensors. A South Korean funding concept has already been submitted for raw-water quality sensors and a dashboard to support more responsive dosing.

Treatment capacity exists, but cannot always be fully used. Average production is around 13,000 m³/day at Kimugu and 8,800 m³/day at Timbilil, while smaller schemes face greater constraints. Kipkelion's 1,200 m³/day capacity is currently unavailable due to flooding damage, and Londiani produces only around 300 m³/day against 780 m³/day capacity.

Treatment gaps are also being addressed at Londiani. Unlike the other schemes, Londiani currently provides only partial treatment. KEWASCO has submitted a Japanese/TOKEME grant proposal for containerised raw-water treatment, providing a potential route to strengthen treatment at the scheme.

ENTRY POINTS

Treatment monitoring & optimisation. Build on the planned sensor investment with real-time raw-water quality monitoring and turbidity-responsive dosing, linking water-quality changes to chemical use, treatment performance and operating cost.

Decentralised treatment solutions. Strengthen treatment at smaller and more vulnerable schemes, building on the Londiani containerised-treatment proposal and assessing where modular treatment could address remaining treatment gaps.



Dry-Season Source Decline

~78%	~2 months/ year	~1.4 million m ³
drop in Timbilil production during dry periods	near-zero intake at Londiani during dry season	capacity of proposed storage dam

Dry-season source availability differs significantly across KEWASCO's schemes. Timbilil and Londiani experience significant seasonal reductions, while the newer Kimugu source is less seasonal. This is increasingly important as major network and connection extensions are planned for Kericho town, increasing the need to secure production.

Timbilil experiences a major seasonal production decline. Production can fall by around 78% during dry periods. KEWASCO compensates by transferring water from Kimugu, allowing the two systems to support each other when Timbilil production falls.

Londiani has a different source constraint. The intake is designed for gravity abstraction, but during dry periods the river level can fall below the intake, leaving insufficient water to abstract. Intake can fall to near zero for around two months, with supply reduced significantly for a scheme serving around 25,000 people.

Larger storage is being considered to secure future supply. A proposed ~1.4 million m³ earth dam, currently at pre-feasibility stage, is intended to buffer Timbilil's dry-season decline and support underserved areas, planned network expansion and future industrial demand.

ENTRY POINTS

Water reuse for source security. Develop treated wastewater reuse for non-potable demand, with the planned Kericho industrial zone as a potential anchor off-taker, reducing pressure on freshwater sources as demand expands.

Source monitoring as a service. Private providers could install and operate river-level, flow and abstraction monitoring, with dashboards and seasonal alerts to support production planning and early response to low-flow conditions.



High NRW & Network Vulnerability

53%	23	7	5
current NRW	Total number of DMAs/Sub-DMAs	Number of functional/actively monitored DMAs/Sub-DMAs	Number of Sub-DMAs with NRW above 60%

NRW remains high at ~53%, but the problem is not uniform across the network. Kericho's ageing infrastructure, incomplete GIS and missing production metering make it difficult to locate losses or separate physical from commercial NRW. The existing 5 large DMAs with 8–16 sub-DMAs may also be too coarse for effective NRW management in some areas.

The Gatsby pilots show that DMA design and network condition matter. A small DMA reduced NRW from 70% to 43%, but replication in a larger DMA was constrained by extensive and costly pipeline rehabilitation. This points to smaller, well-defined zones before scaling.

The CBD is the priority area for NRW reduction. It generates around 50% of KEWASCO's revenue, making improvements here particularly important for cash generation as well as water savings. A KES 2.6bn KfW programme is already supporting CBD pipeline rehabilitation and network expansion.

KEWASCO is also testing smarter network management. A smart-metering pilot, deploying 5 smart meters at car washes, was followed by an order for 1,000 meters, while the LESERA/Danco CBD pilot combines metering, monitoring, billing and payments. The next opportunity is to integrate these systems for loss analytics, pressure optimisation and predictive management.

ENTRY POINTS

Performance-based NRW reduction & DMA management. Start with clearly defined DMAs where metering and network condition allow a reliable baseline, combining targeted meter replacement, leak detection, pressure management and priority pipeline rehabilitation.

Data-driven network management. Integrate metering, flow, pressure, GIS and ERP data to improve loss analytics, system optimisation and predictive maintenance, and better target NRW interventions.



Wastewater Load & Sanitation Resilience

660 m ³ /day	3,500 m ³ /day	~7%	6,000 → 7,200
existing WWTP capacity	planned WWTP capacity	current sewerage coverage	existing → planned sewer connections

Heavy rainfall increases pressure on Kericho's wastewater system. Rainwater entering the sewer network can push flows beyond the existing treatment capacity, while silt entering the system contributes to corrosion and structural deterioration. The existing WWTP is around 30 years old and has a capacity of approximately 660 m³/day.

As a major adaptation measure, the WWTP is being expanded from 660 to 3,500 m³/day, together with sewer-network expansion and approximately 1,200 additional plot connections. This substantially increases treatment capacity, but managing rainfall-related inflows and silt will remain important to protect the expanded system.

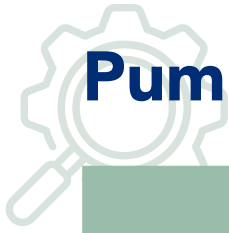
Sanitation coverage remains limited. Around 6,000 properties are currently connected to the sewer network, with much of the wider service area dependent on onsite sanitation. KEWASCO operates three exhauster trucks alongside private emptiers, linking faecal-sludge management to the central treatment system.

Sludge management will become increasingly important as treatment capacity expands. Dried sludge is currently reused by farmers, but without a structured reuse pathway. Higher volumes will require quality assurance, guidance for safe use and more systematic reuse or offtake, while options such as briquettes and biogas remain at an early stage.

ENTRY POINTS

Wastewater / FSM operations. As treatment capacity and connections expand, performance-based operation or treatment-as-a-service could support reliable operation of the enlarged system.

Resource recovery. Treated sludge is already reused in agriculture, while a 2023 pre-feasibility study found briquette production potentially feasible, particularly targeting tea factories as customers. A full feasibility assessment would be the next step before investment.



Pumping, Energy & Limited Storage

3	KES 400,000/ month	<24 hours	97 kW
pumping schemes	combined energy cost at Timbilil & Londiani	treated-water storage buffer	installed hydroturbine currently unused

Pumping requirements vary significantly between schemes. Londiani is fully dependent on pumping, while Timbilil is around 90% gravity-fed. During dry periods, however, additional transfer pumping from Kimugu is required to compensate for lower Timbilil production, adding to operating costs.

Limited treated-water storage reduces operational flexibility. Existing storage cannot buffer a full 24 hours of supply, limiting KEWASCO's ability to manage production interruptions, pumping schedules and fluctuations between production and demand.

Some energy solutions are already being considered. KEWASCO plans to solarise open treatment tanks at Timbilil, while an existing 97 kW hydroturbine could potentially recover energy, although its technical and commercial feasibility remains unclear.

ENTRY POINTS

Energy efficiency as a service. Update the energy audit and identify opportunities for pump optimisation, solarisation and operational improvements, with private providers potentially remunerated against verified energy savings.

Renewable energy for pumping. Develop solar or other distributed energy solutions for pumping-intensive schemes, potentially through private financing and energy/service-based payment models.

Considerations for Internal Measures

Based on the assessment, there are a few initial areas that may be worth exploring with KEWASCO. These would need to be discussed further to confirm their relevance and practicality.

- Use climate information for preventive planning: Link Kenya Met forecasts and rainfall data with bursts, NRW and production to anticipate high-risk periods and plan crews, materials and maintenance.
- Extend GIS to climate and asset risks: Map recurrent flooding/failure points alongside existing leak/burst data to better target protection, maintenance and budgets.
- Improve protection at vulnerable sections: Explore better gabion siting and low-cost slope bioengineering at recurrent failure points.
- Strengthen the NRW baseline before scaling: Complete GIS coverage, distinguish physical and commercial losses, and ensure reliable bulk/zonal metering before expanding DMAs and analytics.



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