



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Bureau
International des
Poids et
Mesures



Kenya-led Regional Quality Infrastructure Cooperation

KEBS has leveraged its technical infrastructure to strengthen metrology capacity across East Africa and beyond

*Kenya Bureau of Standards (KEBS)
Kenya (KE)*



The Challenge

Regional integration is often discussed in terms of markets, tariffs, and policy agreements, but it relies on the silent infrastructure of metrology based on confidence in measurements, standards, and calibration certificates. These measurement foundations support laboratory testing, inspection, certification, and market surveillance decisions used in conformity assessment. Where quality infrastructure is weak, cross-border trade in goods faces delays due to duplicate testing, limited mutual recognition, and uneven regulatory confidence.

Across the East African Community (EAC) and the wider African Continental Free Trade Area (AfCFTA) region, many national quality infrastructure institutions still face capacity constraints in metrology, conformity assessment, market surveillance, and standardization. The United Nations Economic Commission for Africa report identifies significant gaps in Africa's quality infrastructure, with 22 of 54 African countries having minimal or no quality infrastructure. Across the EAC member states, the report classifies the quality infrastructure development as follows: Kenya – well developed; Tanzania – well developed; The Democratic Republic of Congo – reasonably well developed; Rwanda and Uganda – partially developed; Burundi and South Sudan – limited; and Somalia - none or very little.¹

The International Committee for Weights and Measures has further noted that countries without internationally recognized metrology systems are more likely to face non-tariff barriers, delayed market access, and slower industrial growth.² The recent OECD (Organisation for Economic Cooperation and Development)/Bureau International des Poids et Mesures (BIPM) analysis³ notes that trusted, comparable measurements help trade to work more effectively and support regulation, safety, and environmental protection. The regional cooperation provided by the Kenya Bureau of Standards (KEBS) is more than routine technical support: it helps build confidence in the measurements that underpin regional integration and sustainable development.

Before this metrological intervention via regional cooperation took shape, several limitations persisted: gaps in specialized laboratory capability, limited access to advanced testing systems, insufficient technical competence, and weak or still-maturing quality management systems.

¹United Nations Economic Commission for Africa. (2025). Economic Report on Africa 2025: Advancing the Implementation of the Agreement Establishing the African Continental Free Trade Area—Proposing Transformative Strategic Actions.

² International Committee for Weights and Measures (CIPM). (2003). "Evolving needs for metrology in trade, industry and society and the role of the BIPM: A report prepared for the governments of the Member States of the Metre Convention." Bureau International des Poids et Mesures.

³ OECD/BIPM (2020), "International Regulatory Co-operation and International Organisations: The Case of the International Bureau of Weights and Measures (BIPM)", OECD and BIPM.

These weaknesses created practical risks, including unreliable measurements and test data, low regulatory confidence, and the need for repeated testing and calibration. Metrology and quality infrastructure interventions can address these weaknesses by opening technical cooperation channels and strengthening competence in quality management systems, metrology, standardization, and conformity assessment.

The main challenge was that many East African partner institutions, including those across the wider African region, had limited capacity to generate, verify, compare, and rely on measurements and test results across borders. In practice, the issue was whether the results generated in the individual laboratories were technically sound, metrologically traceable, comparable, and ultimately trusted across the region. Partner institutions also needed stronger systems for metrological traceability, equipment calibration, method validation, uncertainty evaluation, and laboratory quality management. Without these systems, technically sound measurements cannot command the level of trust needed to support trade and mutual recognition.

The Solution

This case study examines how to strengthen quality infrastructure to better support trade, consumer protection, industrial competitiveness, and regulatory confidence. The focus of this case study is metrology-led quality infrastructure cooperation. While the interventions also supported broader quality infrastructure functions, the technical core of the case lies in the role of metrological traceability, calibration, measurement comparability, uncertainty evaluation, and laboratory competence in building regional trust. KEBS has supported this effort through technical training, laboratory visits, memoranda of understanding, and calibration services that provide pathways to metrological traceability. It has also responded by hosting delegations, supporting benchmarking visits, signing cooperation agreements, and sharing expertise in metrology, standardization, and conformity assessment. Together, these engagements have illustrated how Kenya's national capability is being used to support the region. In the near term, this will strengthen quality infrastructure institutions, improve measurement reliability, and increase confidence in cross-border conformity assessment. These actions may not have begun as one formal regional strategy, but together they show a clear pattern of practical support for regional technical needs, with a particular focus on knowledge sharing, capacity building, institutional partnerships, and regional cooperation.

This challenge also creates a clear role for metrology-led cooperation as a practical development tool. By sharing expertise through benchmarking visits, providing calibration and training services, and entering cooperation agreements, KEBS helped close some of the region's metrology capacity and quality infrastructure gaps to institutions and laboratories across the continent, including in Uganda, Rwanda, the Democratic Republic of the Congo, Somalia, Seychelles, Tanzania/Zanzibar, Nigeria, and Namibia. These services covered a wide range of measurement fields, including force, Alternating Current/Direct Current (AC/DC) electrical quantities, pressure, length, mass, time, dosimetry, density, temperature, volume,

photometry, and acoustics. Regional institutions and firms are actively seeking metrologically traceable calibrations, technical training, and laboratory support from Kenya to sustain confidence in instruments used for conformity assessment and regulatory decision-making. As a result, Kenya's national capability helped build regional trust by strengthening laboratory practice, staff skills, and institutional cooperation.

The metrology interventions were based on the Kenya Bureau of Standards' measurement capabilities as a regional platform to build confidence in calibration and conformity assessment. KEBS provided practical support through calibration and technical training services to laboratories, manufacturing companies and other firms, and institutions across East Africa and the wider continent, covering several measurement fields. These services improved metrological traceability, built technical skills, and strengthened quality infrastructure, thereby supporting confidence in measurements and conformity assessment in partner countries. The specific interventions are outlined below.

In 2024, KEBS provided direct calibration services to Congo Petrol in the Democratic Republic of the Congo for force and pressure measurements, and to the primary cement manufacturing company (CIMERWA PLC) in Rwanda for force measurements on material testing equipment. In the same year, KEBS also trained personnel from a helicopter maintenance company (Proheli International Limited) of Uganda across several measurement areas, including force and torque, electrical measurements, dimensional measurements, pressure, and mass. A particularly important intervention in 2024 was the attachment of a team from the Malawi Bureau of Standards to the Time and Frequency and Temperature laboratories in November 2024 (see **Figure 1**). The team received training in the fundamentals of metrology and calibration to build the competencies needed to establish the scientific metrology arm of Malawi's National Metrology Institute



Figure 1. A delegation from the Malawi Bureau of Standards at the 1) Time and Frequency Laboratory and 2) Temperature Laboratory during an attachment.

In 2025, KEBS expanded its support in both calibration services and formal institutional cooperation. This included force calibrations for Tororo Cement Limited, a cement company in Uganda, as well as dosimetry support and calibration services for the Uganda National Bureau of Standards and the Bank of Uganda. KEBS also provided measurement support to the Zanzibar Bureau of Standards in density, AC/DC electrical quantities, and force. Further, KEBS and the Uganda National Bureau of Standards signed a memorandum of understanding to strengthen collaboration in metrology, standardization, conformity assessment, and training (see **Figure 2**). The Memorandum of Understanding (MoU) established a framework for technical and scientific cooperation, joint metrology research, harmonization of standards, exchange of technical documents, sharing of laboratory and testing information, inspection cooperation, reciprocal training, and mutual recognition of reports and certificates.

The policy significance of the KEBS–UNBS (Uganda National Bureau of Standards) MoU was captured by Esther Ngari, EBS, Managing Director of the Kenya Bureau of Standards, who described the agreement as a pledge to harmonize approaches to “standardization, testing, metrology, inspection, certification, training and the seamless exchange of information” as core tools for unlocking trade between Kenya and Uganda. She further noted that “standards are the quiet enablers of trade, the invisible threads that make trust possible between markets” and described them as the “passports our goods carry as they cross borders.”

This statement reinforces the central policy message of the case study: metrology and quality infrastructure cooperation are not simply technical or administrative activities. They provide the trust infrastructure required for goods, certificates, test reports, and regulatory decisions to move across borders with greater confidence.

During the same period, KEBS engaged regional partners through benchmarking visits and study tours. These included the Somalia Bureau of Standards, Malawi Bureau of Standards, Standards Association of Zimbabwe, Standards Organization of Nigeria, Burundi Bureau of Standards, and Quality Control, and the Zanzibar Bureau of Standards. KEBS also worked with international partners on quality infrastructure cooperation, including TradeMark Africa, Physikalisch-Technische Bundesanstalt (PTB), and the Economic Community of West African States (ECOWAS) Commission. Together, these engagements reinforced Kenya’s role as a platform for technical capacity development and measurement-related institutional cooperation.



Figure 2. Signing of a memorandum of understanding between the Kenya Bureau of Standards and the Uganda National Bureau of Standards

In 2026, technical regional metrology support continued with KEBS, which provided calibration services to Keane Engineering Technologies Ltd, a calibration service provider in Uganda across force, mass, AC/DC electrical quantities, time, temperature, and dosimetry. It also delivered force measurement calibration for Kongsberg Maritime, a maritime company in Namibia and VS Hydro Rwanda Ltd, a hydropower engineering company in Rwanda, as well as mass and force measurement support to Docol Construction Rehabilitation and Trading Company, a construction and infrastructure company in Somalia. Further support took the form of specialized technical training and laboratory exposure. An example was the regional training on lead determination in paint, which brought together experts from Uganda, Tanzania, Rwanda, Zimbabwe, and Burundi, with support from the Lead Exposure Elimination Project. The programme also included a two-week attachment for 11 Mercer University students, providing hands-on experience with advanced lead-analysis technologies (see **Figure 3**). This intervention strengthened laboratory capability in an area directly linked to consumer safety and public health.



Figure 3. Lead determination in paint training at the Kenya Bureau of Standards (KEBS) laboratories.

Across these interventions, metrological traceability was ensured, where relevant, through KEBS' calibration system, reference standards, documented procedures, uncertainty evaluation, competent personnel, and laboratory quality management practices. The interventions were anchored in both international and regional metrology frameworks, and all the measurement scopes were supported by Kenya's published Calibration and Measurement Capabilities (CMCs). Where Kenya has not yet published CMCs for specific scopes, KEBS maintains metrological traceability by calibrating its reference standards against internationally equivalent primary standards maintained by national metrology institutes that issue the CMCs.

A Quantifiable Impact

The metrological intervention produced measurable results across four levels: 1) calibration and training services delivered, 2) regional reach, 3) metrology capability strengthening, and 4) institutional and capacity-building interventions. The available evidence is strongest on outputs and operational reach, and less conclusive on broader developmental effects.

Evidence collected before, during, and after the intervention showed both regional demand for Kenya's metrology services and the practical support that KEBS provided. Throughout the intervention period, the evidence pointed to sustained demand for calibration and training, laboratory visits, benchmarking tours, and records of institutional cooperation, including memoranda of understanding.

The main operational dataset consisted of metrology services request records. These records from 2024 to 2026 documented calibration and training services delivered to clients in Uganda, Rwanda, the Democratic Republic of the Congo, Somalia, Seychelles, Tanzania/Zanzibar, Nigeria, and Namibia. The services covered measurement scopes in AC/DC electrical quantities, mass, force, pressure, time, temperature, density, dosimetry, volume, photometry, and acoustics. Force measurement was the most prominent, appearing in 12 of the 18 metrology services request records. Other recurring fields included AC/DC electrical measurements, pressure, length, time, dosimetry, mass, and temperature. The consolidated metrology services request data show that KEBS delivered 18 documented regional metrology interventions across Africa. Of these, 17 were calibration assignments, and one was a technical training assignment. The majority of these assignments served East Africa (Uganda and Rwanda were the most frequent).

Evidence of institutional cooperation and capacity building was captured separately through memoranda of understanding (MoUs), study visits, attachments, benchmarking visits, and technical training (see **Table 1**). This evidence also covered engagements with institutions from Malawi, Burundi, Somalia, Zanzibar, Zimbabwe, Nigeria, ECOWAS-related partners, and other regional and international organizations. KEBS also facilitated visits and signed memoranda of understanding to expand regional cooperation. **Table 2** highlights some of the institutional cooperation engagements.

Table 1. Evidence of institutional cooperation and capacity building.

Source category	Evidence used	Purpose in the case study
Operational metrology records	Consolidated metrology services request records; calibration and training records	To show countries served, dates, clients, measurement areas and services delivered.
Training and attachment evidence	Training records, laboratory attachment examples and regional technical training posts	To show capacity building and transfer of practical measurement knowledge.
Institutional cooperation records	MoUs, cooperation announcements, benchmarking visits and study tours	To show formal and structured cooperation between quality infrastructure institutions.
Public disclosures	KEBS social media posts (LinkedIn/X posts, Facebook) and institutional communication.	To corroborate visits, technical exchanges, MoUs, and training activities.

Table 2. KEBS-facilitated institutional cooperation engagements

Date	Intervention	Countries/ institutions involved	Focus area	Measurable/ observable result
30 Nov 2024	Laboratory attachment/ scientific metrology capacity building	Malawi Bureau of Standards; KEBS Temperature Metrology Laboratory; KEBS Time & Frequency Metrology Laboratory	Fundamentals of measurement and calibration; scientific metrology development	The Malawi Bureau of Standards team attached to KEBS laboratories to support the development of Malawi's scientific metrology capability.
Jun 2025	Work visit/ institutional learning	Somali Bureau of Standards; Somalia livestock-sector delegates; KEBS	Quality infrastructure, regional trade, and laboratory systems	Five-day work visit to KEBS headquarters; strengthened knowledge of KEBS systems and facilities.
30 Jul 2025	MoU/ formal regional cooperation	Uganda National Bureau of Standards; KEBS; Governments of	Standards, conformity assessment, metrology, training, testing,	MoU signed to enhance trade, market access, and industrial development through cooperation in

		Uganda and Kenya	inspection, mutual recognition	standards, metrology, conformity assessment, and training.
Aug 2025	Bench-marking visit	Malawi Bureau of Standards; KEBS	Standardized practices; regional integration; AfCFTA alignment	A three-day benchmarking visit was undertaken to strengthen professional links and align standardized practices.
Oct 2025	Regional study/ technical exchange	ECOWAS Commission; TradeMark Africa; KEBS	TBT, SPS, standards harmonization, laboratory systems	ECOWAS delegation toured KEBS laboratories and exchanged best practices on TBT/SPS and standards harmonization.
Nov 2025	QI cooperation/ technical project engagement	PTB; KEBS	Leather proficiency testing, regional exchange programmes, and accreditation support	Collaboration discussions held on strengthening quality infrastructure for selected EAC sectors, including leather proficiency testing and accreditation support.
Nov 2025	Study tour	Standards Association of Zimbabwe; KEBS	SME certification model; import inspection systems	Five-day study tour focused on learning from KEBS' SME Certification Model and import inspection systems.
Mar 2026	Courtesy visit/ laboratory exposure	Standards Organization of Nigeria; KEBS	Standards development, certification frameworks, consumer protection, and laboratory services	Delegation toured KEBS laboratories and engaged in institutional collaboration in standards, certification, and consumer protection.
24 Mar 2026	MoU/ technical cooperation	KEBS; Burundi Bureau of Standards and Quality Control	Standardization, metrology, and conformity assessment	A framework for cooperation was established to facilitate the exchange of scientific and technical

				expertise between the two institutions.
May 2026	MoU/ institutional cooperation	Zanzibar Bureau of Standards; KEBS	Collaboration, alignment, and mutual support	MoU signed to provide a cooperation framework between KEBS and the Zanzibar Bureau of Standards.
May 2026	Regional technical training/ laboratory capacity building	KEBS; Lead Exposure Elimination Project; experts from Uganda, Tanzania, Rwanda, Zimbabwe, Burundi, and Mercer University students	Lead determination in paint; consumer safety; laboratory competence	Regional training delivered on lead-in- paint testing; strengthened technical capacity in lead analysis and included laboratory attachment for 11 Mercer University students.

The interventions produced several important capability outcomes across the region. First, partner institutions gained access to metrologically traceable calibration services in multiple measurement fields. Second, technical personnel received specialized training, while institutions were exposed to KEBS' laboratory systems, procedures, traceability practices, and quality management approach.

A key milestone was the 2024 attachment of a team from the Malawi Bureau of Standards to KEBS' Temperature and Time and Frequency Metrology laboratories. This cooperation supported Malawi's effort to establish the scientific metrology arm of its National Metrology Institute. Its importance lies in the fact that it went beyond service delivery: it showed Kenya's active support for the development of another country's national measurement capability. Formal agreements and technical exchanges also laid the foundation for continued collaboration. For example, the memorandum of understanding between the Uganda National Bureau of Standards and KEBS established a broad framework covering metrology, conformity assessment, training, testing, inspection, mutual recognition of test reports, and joint metrology research. This, in turn, strengthens the foundation for future measurement comparability and greater confidence in trade.

Prior to the metrological intervention, the regional measurement environment was fragmented. Laboratories and partner institutions often had to seek support outside the region to develop competence, facilitate technical exchange, enhance metrological traceability, and build greater measurement confidence in conformity assessment. Such extra-regional support generally came at a higher cost, making it harder to sustain robust measurement systems over time.

As part of the metrological intervention, KEBS used its technical infrastructure to strengthen metrology capacity across East Africa and beyond. This formed part of a broader effort to use national laboratory capability for regional calibration, training, and cooperation. The evidence is strong on outputs and capability gains, but less clear on wider socioeconomic effects. Follow-up data is still needed to confirm impacts such as shorter turnaround times, lower costs, or better public health compliance. Even so, the broader economic case remains persuasive. Research, including work commissioned by the BIPM, suggests that mutual recognition systems are more efficient than fragmented bilateral arrangements.⁴ Kenya's metrology system is therefore helping to build the trust needed for deeper intra-African trade.

The interventions supported policy implementation by improving the technical reliability of measurement methods used for testing, certification, inspection, and market surveillance. Calibration services provided to regional clients helped ensure that measurement instruments generated dependable results. This is important because many regulatory decisions depend on measurement evidence. Products may be accepted, rejected, certified, recalled, or further investigated based on test and inspection results. If the instruments behind those results are

⁴ KPMG Consulting LP. (2002). "Potential economic impact of the CIPM Mutual Recognition Arrangement: Final report." Bureau International des Poids et Mesures.

not calibrated, metrologically traceable or properly used, enforcement becomes weaker and easier to challenge. KEBS' support helped partner institutions and regional clients build stronger confidence in their measurement systems. Specialized training also had direct policy relevance. For example, regional training in lead determination in paint strengthened laboratory capability in an area linked to consumer safety and public health. Likewise, benchmarking of import inspection systems, SME certification models, and laboratory operations supported more consistent approaches to enforcement, certification, and market access.

Several practical lessons emerge from this case study:

- **Measurement capacity is a governance asset.** It helps public institutions make decisions based on reliable evidence rather than assumptions, repeated tests or disputed certificates.
- **Regional cooperation must be operational rather than ceremonial.** Memoranda of understanding matter most when calibration services, training, attachments, benchmarking visits, laboratory exposure, and receive technical follow-up.
- **Trust in trade depends on trust in data.** A certificate, inspection report, or test result has significance only when the underlying measurement system is reliable, traceable, and comparable.
- **Capacity building is most effective when it combines people, systems, and infrastructure.** Training alone is insufficient if laboratories lack procedures, reference standards, quality systems, and opportunities for comparison. In the same way, equipment alone cannot deliver results without skilled personnel and strong institutional discipline.
- **Evidence registers matter.** By organizing interventions by date, country, focus area, output, and evidence source, institutions can turn scattered activities into institutional memory and policy-relevant evidence.

This case study has illustrated that metrology infrastructure is more than a laboratory function – it helps policy work in practice. Metrology provides a practical mechanism for addressing the regional problem identified at the outset: the limited capacity to generate, verify, compare, and trust measurement results across borders. Standards, regulations, and trade agreements only deliver results when they are backed up by reliable measurements, trusted test results, and sound conformity assessment. Better access to metrologically traceable calibrations, technical training, laboratory exposure, and institutional cooperation strengthens the conditions needed for trade, consumer protection, industrial development, and public confidence in regulation. Metrology should be treated as strategic infrastructure. It helps governments apply standards, enforce regulations, protect consumers, support industry, and take part more effectively in regional trade.

Lastly, this case study demonstrates the long-term value of sustained investment in national metrology capability. Kenya's ability to support regional partners grew from earlier investments in laboratories, reference standards, trained personnel, calibration systems, quality management, international recognition, and institutional credibility. When a country invests in metrology, it strengthens not only its own industrial and regulatory systems but also its ability to support regional development. KEBS's work with neighbouring and regional institutions shows how a national measurement system can also serve a wider regional purpose by helping other institutions improve traceability, comparability, and confidence in measurement results.

Acknowledgments. This case study draws on evidence from the Kenya Bureau of Standards and its regional partner institutions. It also recognizes the contribution of partner institutions from Malawi, Uganda, Somalia, Zanzibar, Burundi, Zimbabwe, and Nigeria, as well as regional and international partners such as ECOWAS, TradeMark Africa, PTB, and the Lead Exposure Elimination Project.

POC: Kiplangat Kobur, koburk@kebs.org