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A COOKING EVENT AT STRATHMORE UNIVERSITY

Electric Appliance Quality Ecosystem

A Scoping Report for the Kenyan Market

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Executive Summary

Kenya stands out in Africa and globally as one of the countries with an electricity grid whose power generation is largely obtained from renewable energy sources – over 85%. Its electricity access rate is also among the highest in sub-Saharan Africa. Despite these commendable statistics, the use of electricity for cooking in the country remains exceptionally low. It accounts for less than 4% of the cooking methods used, with bioenergy and LPG being the predominant options. To encourage the adoption of electric cooking towards the goal of achieving universal access to clean cooking by 2028, Kenya's Ministry of Energy is developing a National eCooking Study and Strategy, which will feed into the National Clean Cooking Strategy 2022-2028.

The quality of electric cooking appliances plays a critical role in supporting the country's journey towards the adoption of electricity for cooking. Thus, the research undertaken, and findings captured in this report focus on three main objectives:

I. To map and assess the electric cooking quality ecosystem in Kenya.
II. To identify quality challenges that affect electric cooking technologies in Kenya.
III. To propose recommendations that will assist in improving the electric cooking quality ecosystem in Kenya.

This research was conducted using mixed-method research comprising a desktop review of grey and published literature, a household survey, qualitative key informant interviews and stakeholder workshops. The report uses the household electric appliance ecosystem as a basis for drawing conclusions about the context in which household electric cooking appliances exist. This approach was adopted because the household electric appliance ecosystem serves as the overarching ecosystem in which electric cooking appliances are situated. The life of a household electric appliance and the quality ecosystem within which it exists is mapped throughout the household appliance value chain. This identifies and analyses the distinct roles played by stakeholders involved from the importation of appliances to their eventual end-of-life disposal and examines how these stakeholders contribute to the quality ecosystem.

A definition of the term 'quality infrastructure' is foundational to an understanding of what exactly QI entails in the context of electric cooking in Kenya. The International Network on Quality Infrastructure defines Quality infrastructure (QI) as the collective term used to describe metrology, standardisation, conformity assessment, accreditation, and market surveillance activities. It denotes the ecosystem of public and private institutions together with the policies, relevant legal and regulatory framework, and practices needed to support and enhance the quality, safety and environmental soundness of goods, services, and processes. In national contexts, QI enables the interoperability and compatibility of products fostering fair competition, facilitates verification of product quality, as well as ensuring substandard and unsafe products are withdrawn from the market. In the international sphere, QI facilitates entry into foreign markets which require goods and services to comply with designated standards. Developed countries have a robust QI system unlike developing countries which typically have significantly less robust QI systems.

Kenya's QI ecosystem has evolved and continues to evolve considerably, particularly in the last two decades when several QI-related policies have been adopted, laws enacted, and various institutions established to facilitate their implementation and enforcement. The report discusses the role of some of these – The Standards Act, Weights and Measures Act, Kenya Accreditation Service Act, National Quality Infrastructure Policy, and Technical Regulations. The important role played by institutions such as the Kenya Bureau of Standards (KEBS) and the Kenya Accreditation Service (KENAS) is also explored.

The country's conformity assessment system was examined as part of this research, owing to its importance in assessing whether a product, system, service, or individual meets requirements and characteristics outlined in a standard or specification. Such requirements may relate to safety, performance, efficiency, effectiveness, reliability, durability, or environmental impacts. The report provides important insights into this system as it relates to product inspection processes, information on accredited testing laboratories and certification mechanisms.

Findings of this research on quality verification of electrotechnical goods and appliances – most of which are imported – indicate that the testing capacity of Kenyan laboratories is considerably limited as they do not have the necessary testing equipment or required personnel. Regulatory authorities therefore rely on a Pre- Export Verification

of Conformity (PVoC) program. Minimum Energy Performance Standards (MEPS) are highlighted as an important stride in strengthening the QI system. A key shortcoming of this MEPS program, however, is that the standards do not extend to electric cooking appliances.

Weaknesses in Kenya's QI infrastructure system inevitably results in the infiltration of poor-quality appliances into the market. The role played by repair technicians then comes into focus and the role they can play in supporting the appliance ecosystem by repairing faulty products, particularly those whose warranty period has lapsed. The research established that these repair technicians operate in a largely informal system. Where consumers may wish to seek legal redress regarding poor quality products purchased, the role of the judiciary is highlighted and the challenge of significantly low penalties prescribed in law is identified as one key weakness that needs to be addressed, to deter those who sell poor quality products in Kenya.

The report concludes by capturing several actionable recommendations that can guide policymakers and industry stakeholders in facilitating the adoption of good quality electric cooking appliances:

1. **Quality Marks**
   - ▷ The Kenya Bureau of Standards (KEBS) should **revise the national quality mark system to address specific needs of electrical appliances,** Additionally, MECS and other partners can collaborate to develop specialised marks for electric cooking appliances. These marks should incorporate technologies like QR codes into product labels to make the verification process more accessible and reliable.
   - ▷ The Energy and Petroleum Regulatory Authority (EPRA) should develop **new energy efficiency labels** for electric cookers, including QR codes for detailed information, in collaboration with manufacturers, consumer advocacy groups, and energy experts.
   - ▷ KEBS should establish **robust systems for consumers to report questionable quality marks,** with a commitment to timely follow-up actions to maintain consumer trust.

2. **Testing Laboratories**

- The Ministry of Industrialization, Trade, and Enterprise Development should invest in **modern testing equipment and enhance the infrastructure of local laboratories,** with support from KEBS and international donors.

- KEBS, in partnership with Technical and Vocational Education and Training (TVET) institutions, should implement **comprehensive technical training programs for laboratory personnel.**

3. **Consumer Education and Awareness**

- The Ministry of Energy, MECS and other partners in collaboration with consumer advocacy groups and media partners, should launch **education programs to engage consumers on purchasing good quality electric appliances,** leveraging retailers and repair technicians as information delivery agents.

- The Competition Authority of Kenya (CAK), in collaboration with KEBS and consumer protection agencies, should establish **clear consumer complaint, redress channels, and educate consumers about warranties and legal options.**

4. **The Repair Ecosystem**

- Manufacturers, in collaboration with the Ministry of Industrialization, Trade, and Enterprise Development, **should identify knowledge gaps and develop training programs for repair technicians.**

- Community-based organizations, supported by local governments and international development partners, **should implement repair cafés for electric appliances, providing regular training and skill-sharing workshops.**

5. **Legal and Policy Reforms**

- Regulatory agencies like EPRA and the Anti-Counterfeit Authority (ACA) should form partnerships with industry stakeholders and consumer advocacy groups to **encourage self-regulation.**

- The National Quality Infrastructure (NQI) committee, including representatives from KEBS, EPRA, ACA, consumer groups, and technical experts, should

coordinate the quality ecosystem for electric appliances.

- The Ministry of Justice, in collaboration with the Judiciary and CAK, should update consumer protection laws to **provide a robust framework for addressing quality issues, including enhanced penalties for violators and specialized training for judicial officers.**

6. **Training and Capacity Building**

- The Ministry of Industrialization, Trade, and Enterprise Development should **facilitate partnerships between manufacturers and training institutions to co-host workshops and seminars for technical training.**

- The Ministry of Education, in collaboration with TVET institutions and KEBS, should seek **government endorsement for training programs and integrate them into existing curricula.**

The findings of this study aim to serve as a valuable resource in the development of a robust quality framework in Kenya through the collaborative effort of policy makers, importers, retailers, MECS, other development partners and other stakeholders. It is abundantly clear that significant work needs to be done to strengthen Kenya's QI system and more so as it relates to electric cooking appliances. It is hoped that this report will spur much-needed action by all stakeholders to ensure Kenya accelerates progress towards the attainment of SDG7, by ensuring access to affordable, reliable, sustainable, and modern energy for all.

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1. Introduction

1.1. Electricity and Electric Cooking

Kenya has made significant strides in the adoption of renewable energy sources in recent years, with 85% of its electricity being generated from such sources between 2019 and 2022. The country's Least Cost Power Development Plan (LCPDP) predicts that renewable energy will dominate the electricity mix by 2041. Additionally, more than 75% of Kenyans have access to electricity, with a target of achieving universal access by 2026.

Of particular interest are the efforts being made to increase the use of electric cooking technologies. In the context of low- and middle-income economies such as Kenya, the adoption of clean cooking technologies is viewed as a means of achieving various Sustainable Development Goals (SDGs) [1]. These include SDG 7 on affordable and clean energy, SDG 3 on good health and wellbeing, and SDG 5 on gender equality. Several global and local programs have been developed to facilitate the uptake of such technologies, including both thermal and electric cooking options. The adoption of electric cooking in Kenya has the potential to reduce indoor air pollution, deforestation, and carbon emissions. However, despite these potential benefits, the uptake of electric cooking (e-cooking) solutions remains low.

To address this issue, various interventions have been put in place to increase the adoption of electric cooking in Kenya. One such program is the Modern Energy Cooking Services (MECS) initiative, which is funded by UK Aid. The program aims to promote the use of electric cooking by developing innovative business models and technologies that are affordable and reliable for consumers. In Kenya, MECS is partnering with the Ministry of Energy and the Kenya Power and Lighting Company (KPLC) to raise awareness of electric cooking and increase the demand for such appliances [2].

1.2. The Electric Cooking Market in Kenya

The global initiative towards modern and environmentally friendly cooking practices has spurred various countries to establish their targets in this regard. Kenya, too, is committed to attaining its clean cooking objectives by 2028. A key strategy in Kenya's

pursuit of clean cooking involves promoting the widespread adoption of electric cooking among households. While 75% of households in Kenya are connected to electricity, only a mere 1% presently rely on electricity as their primary cooking fuel.

According to the 2019 Kenya Population and Housing Census (KPHC) conducted by the Kenya National Bureau of Statistics (KNBS), 50.4% of households in Kenya use electricity as their primary power source and 19.2% use solar for lighting purposes. 0.9% and 0.2% of households use grid electricity and solar for cooking purposes, respectively [3]. The National Electric Cooking Strategy projects minimal adoption of electric cooking based on the stated policies of up to less than 1% adoption by 2028 and minimal growth of 1.14% by 2050 [4].

HIVOS and the World Future Council studies reveal that electric cooking technologies, such as the slow cooker and the electric pressure cooker (EPC), are cost-competitive compared to other clean cooking technologies. However, only 3% of Kenyan households own electric cooking appliances such as electric stoves and microwaves [5]. Household ownership of electric cooking appliances increases to 23.9% when you include a wider array of electric kitchen appliances such as electric water heaters [6]. The low penetration of electric cooking is attributed to the prohibitive cost of cooking appliances and consumer perception of electricity prices as being high.

To advance the widespread use of electric cooking, Kenya is developing the Kenya National Electric Cooking Strategy (KNeCS) currently in its 4th draft for public participation [4]. This strategy will complement the National Clean Cooking Strategy, which has set the ambitious goal of achieving universal clean cooking in Kenya by 2028. Given the ambitious scale of electric cooking appliance adoption as envisioned in the KNeCS, it is crucial to actively identify and address potential quality challenges that may emerge during implementation. Therefore, the aim of this report is to enable the successful implementation of the KNeCS by outlining the quality considerations that should be accounted for during its development and implementation.

1.3. Objectives

For adequate scoping and analysis of the quality ecosystem of electric cooking appliances, the following specific objectives were used to guide the study:

I. To map and assess the electric cooking quality ecosystem in Kenya.
II. To identify quality challenges that affect electric cooking technologies in Kenya.
III. To propose recommendations that will assist in improving the electric cooking quality ecosystem in Kenya.

1.4. Report Breakdown

This report on the quality ecosystem for electric appliances in Kenya employs a mixed-methods research design comprising a desk review, household survey, qualitative interviews with key informants, and stakeholder workshops. These methods provided a comprehensive understanding of the quality infrastructure (QI) ecosystem, highlighting its challenges and opportunities for improvement.

Chapter 3 provides a foundational understanding of Kenya's QI ecosystem, focusing on the legal and regulatory frameworks, the roles of key institutions, and the processes involved in ensuring the quality and safety of electric appliances. This chapter sets the stage by describing the idealised operations of the QI ecosystem and the efforts of various stakeholders in maintaining quality standards.

Chapter 4 builds on the insights from Chapter 3 by presenting the actual implementation of the QI ecosystem in Kenya. It reveals the discrepancies between the ideal and real scenarios, highlighting issues such as the importation of defective products, the limitations of market surveillance, and the challenges faced by local testing laboratories. This chapter provides a detailed analysis of the current state of the electric appliance quality ecosystem, based on data collected through household surveys and key informant interviews.

Together, these chapters provide a comprehensive view of Kenya's QI ecosystem for electric appliances, identifying gaps and challenges while offering insights into the realities of the system. This understanding is crucial for developing actionable recommendations to improve the quality and safety of eCooking appliances in Kenya, which are presented in Chapter 5, the recommendations chapter. This chapter provides actionable guidance for enhancing the quality ecosystem for electric cooking appliances in Kenya. It suggests revising quality marks, improving testing laboratories,

launching consumer education programs, strengthening the repair ecosystem, implementing legal and policy reforms, and promoting training and capacity building. Finally, the future research section identifies areas requiring further investigation to deepen the understanding and improvement of the electric appliance quality ecosystem in Kenya.

1.5. Scope and Limitation of Work

This report maps the life of an electric appliance and the quality ecosystem within the household electrical appliance value chain. It identifies and analyses the roles of stakeholders involved from the importation of appliances to the eventual end-of-life disposal and examines how these stakeholders contribute to the quality ecosystem.

The report is founded on the premise that quality is pivotal to the adoption of electric cooking appliances at scale. To support this premise, the report uses the household electric appliance ecosystem as a basis for drawing conclusions about the context in which household electric cooking appliances exist. This approach is chosen because the household electric appliance ecosystem serves as the overarching ecosystem in which electric cooking appliances are situated.

Due to the nascent nature of the electric cooking ecosystem in Kenya, the study extrapolates inferences regarding the electric cooking appliance quality ecosystem from observing the wider household electric appliance ecosystem. The inferred quality trajectory of the wider household electric appliances is then used to inform recommendations for the widespread adoption of electric cooking appliances while mitigating or preventing adverse quality-related outcomes and events.

The outcomes of this study aim to serve as a resource in the development of a robust quality framework, for policymakers, importers, retailers, MECS and other development partners, and other stakeholders. This framework, informed by the findings of this research, should facilitate the adoption of high-quality electric cooking appliances in Kenya, ultimately increasing the percentage contribution of electricity to cooking solutions in the country and potentially beyond.

2. Methodology

This research employed a mixed-methods research design comprising four parts:

I. A desk review of grey and published literature.
II. A household survey.
III. Qualitative interviews with key informants.
IV. Two stakeholder workshops.

The research integrated quantitative and qualitative approaches to investigate the electric appliance quality ecosystem and address the study objectives. Quantitative data was collected through a face-to-face survey administered to 306 households while qualitative data was gathered through key informant interviews and two stakeholder workshops. The following sections detail each data collection method:

2.1. Review

The initial phase of this research involved a desk review which sought to provide an understanding of the electric appliance quality ecosystem in Kenya. The literature review examined the ecosystem, existing policies, standards, and regulations related to the quality of electric appliances. It incorporated a wide range of sources, including both grey literature and published literature from academic journals, working papers, and government reports. The desk review served as a foundation for understanding the regulatory and policy landscape concerning the quality ecosystem within which electric appliances exist. This review sought to identify any gaps or challenges in the existing policy and regulations, such as areas where quality standards may be lacking, enforcement may be weak, or consumer awareness may be limited. These gaps were then considered in the subsequent phases of the research to guide data collection efforts.

2.2. Household Survey

Household data collection took place in Kericho and Kisumu counties with 306 households participating in the survey. These counties were chosen due to their

alignment with an ongoing electric cooking pilot project[1]. The aforementioned project focused on sites within the last mile connectivity project, primarily targeting newly connected households. However, both locations included recently electrified sites and older electrified sites, and the project contributing to this study did not differentiate based on the age of the electric connections.

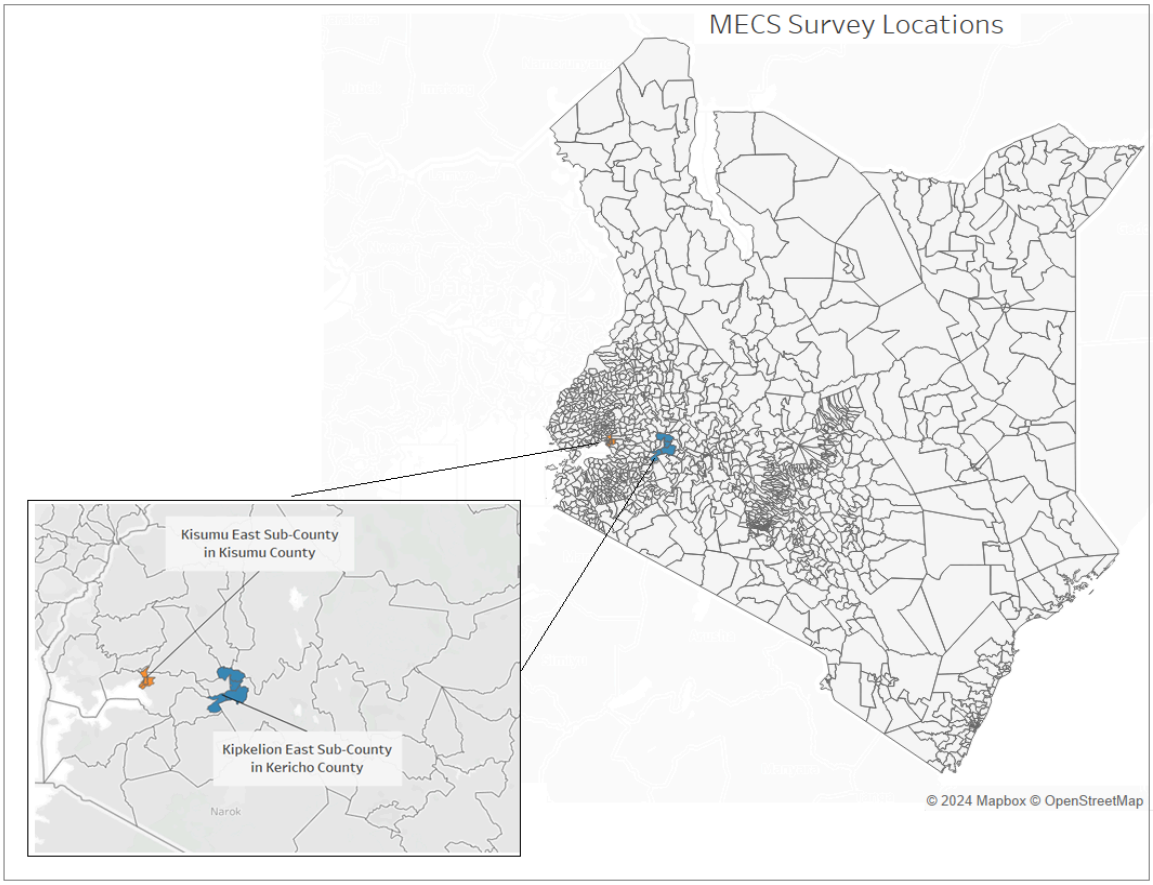


Figure 2-1: *Household survey data collection sites.*

The household survey was conducted using purposive sampling, targeting households with specific criteria to augment the relevance of the data collected. To be eligible for inclusion, households had to have an electricity connection and had to own a failed household electric appliance, as understanding the experiences and responses related to household electric appliance failures was a crucial element of the study. Both cooking, for example blender, toaster, electric kettle; and non-cooking for example

[1] The Last Mile Connectivity Project is a Kenyan Government program to link Kenyan rural and slum households to the national power grid [7].

television, radio, iron box; electric appliances were considered as a proxy for eCooking appliances given their nascent market.

The purposive sampling approach ensured that the survey sample represented a diverse range of households with varying appliance usage patterns, electricity access, and household electric appliance performance issues. Trained enumerators, hailing from the regions where the survey was administered and proficient in the local languages, conducted face-to-face interviews with selected households. This approach not only ensured effective communication with respondents but also fostered a deeper understanding of local contexts and perspectives.

The survey, found in Appendix A, consisted of four sections as follows:

1. **Household demographics and socio-economic indicators:**
   This section of the survey collected data on household demographics and socio-economic indicators. This information served as contextual background, enabling the understanding of the socio-economic profile of the respondents.

2. **Electric cooking and appliance ownership:**
   The second section identified the types of electric appliances (including cooking), owned and in use by households, as well as the reasons behind their purchase. This section also explored the information provided by retailers during the purchase of these appliances, shedding light on consumer knowledge and decision-making processes.

3. **Product failure and repairs:**
   The third section captured data related to product failures experienced by households. It sought to identify and provide an understanding of the types and frequency of failures and the actions taken by consumers to address these issues. This section provided critical insights into the repair ecosystem that is used by households.

4. **Awareness of quality marks:**
   The fourth section gauged the level of awareness among survey participants regarding quality standards and quality marks associated with electric cooking appliances. This provided insights into consumer knowledge and perceptions regarding appliance quality.

2.3. Key Informant Interviews

The key informant interviews (KIIs) served as a vital component of this study, providing an in-depth understanding of the quality ecosystem of household electric appliances. Purposive sampling approach was employed to identify and engage key informants who possessed extensive knowledge and experience related to the quality of electric appliances and electric cooking appliances, where possible. The sample comprised representatives from government agencies, private sector importers, and professionals from testing laboratories, where one had experience with electric cooking tests.

A total of 10 experts participated in the key informant interviews across nine sessions. Among these experts were five individuals from four different government agencies: Kenya Bureau of Standards (KEBS), Kenya Accreditation Service (KENAS), Kenya Electricity Generating Company (KENGEN)[2] and, the Energy and Petroleum Regulatory Authority (EPRA), three professionals from two separate testing laboratories and two importers from the private sector. It is noteworthy that securing the participation of importers proved to be a challenging endeavour. Despite the assurance of anonymity and confidentiality, many were hesitant to engage in the interviews. Regardless of this, the two participants provided valuable insights for the report.

2.4. Stakeholder Workshops

Stakeholder engagement workshops were held in Nairobi, funded by the Royal Academy of Engineering Safer Complex Systems program. The workshops were part of a deliberate effort to make the research collaborative and iterative, given the complex nature of the topic at hand. They were used to obtain feedback, facilitate discussions, and provide insights from key actors in the electrical appliance ecosystem. Two workshops were organized as follows:

1. **Breakfast Meeting on 6th April 2023**

   This gathering brought together twenty-five select stakeholders for a focused discussion on the research findings. At this meeting centred around the ecosystem and its value chain. The meeting was an interactive session that allowed stakeholders to engage with the research outputs and contribute valuable perspectives. The insights shared and feedback provided by the attendees was

[2] Representatives from KENGEN's Calibration Centre

pivotal in refining and enhancing the content of this report.

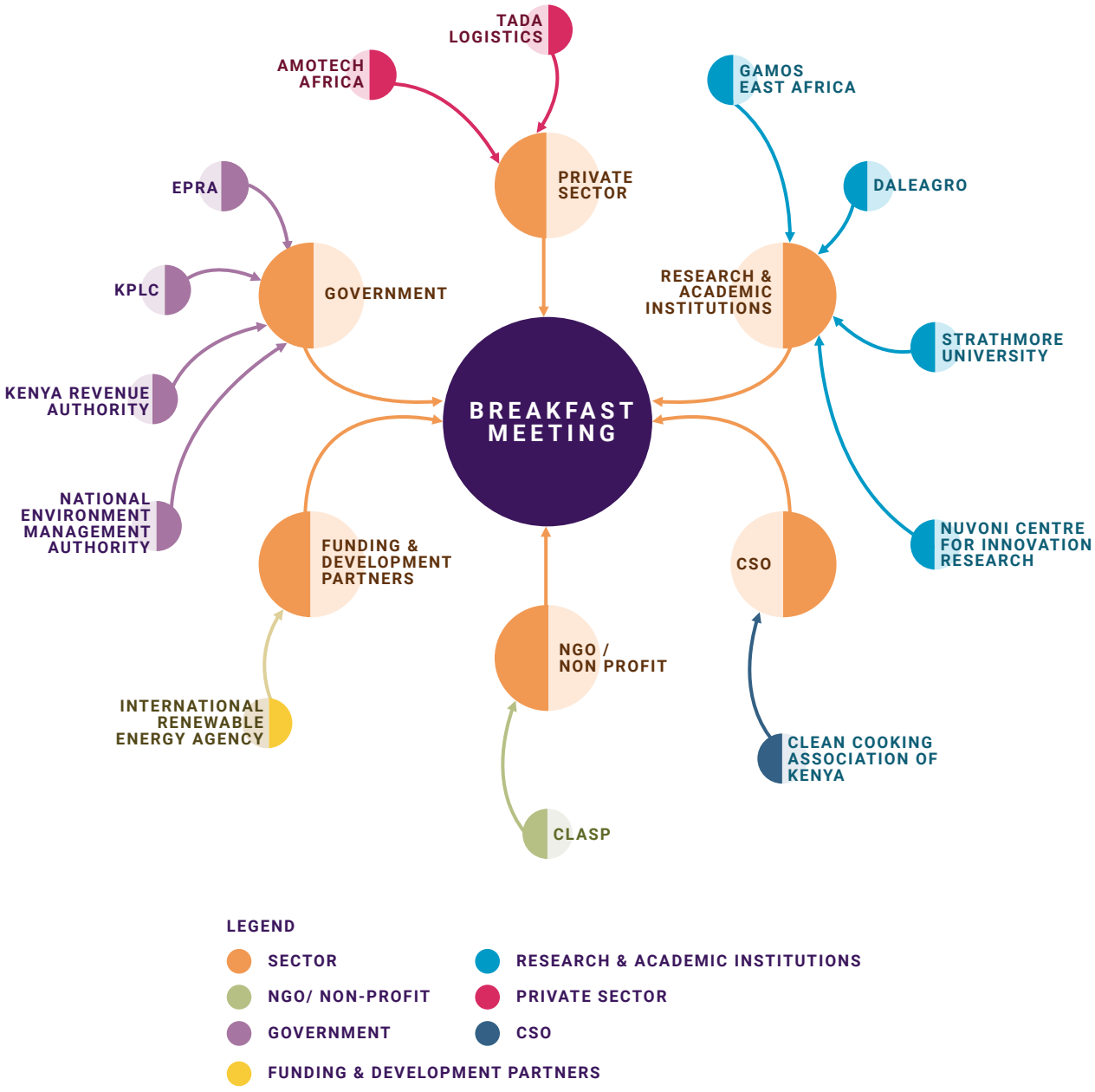
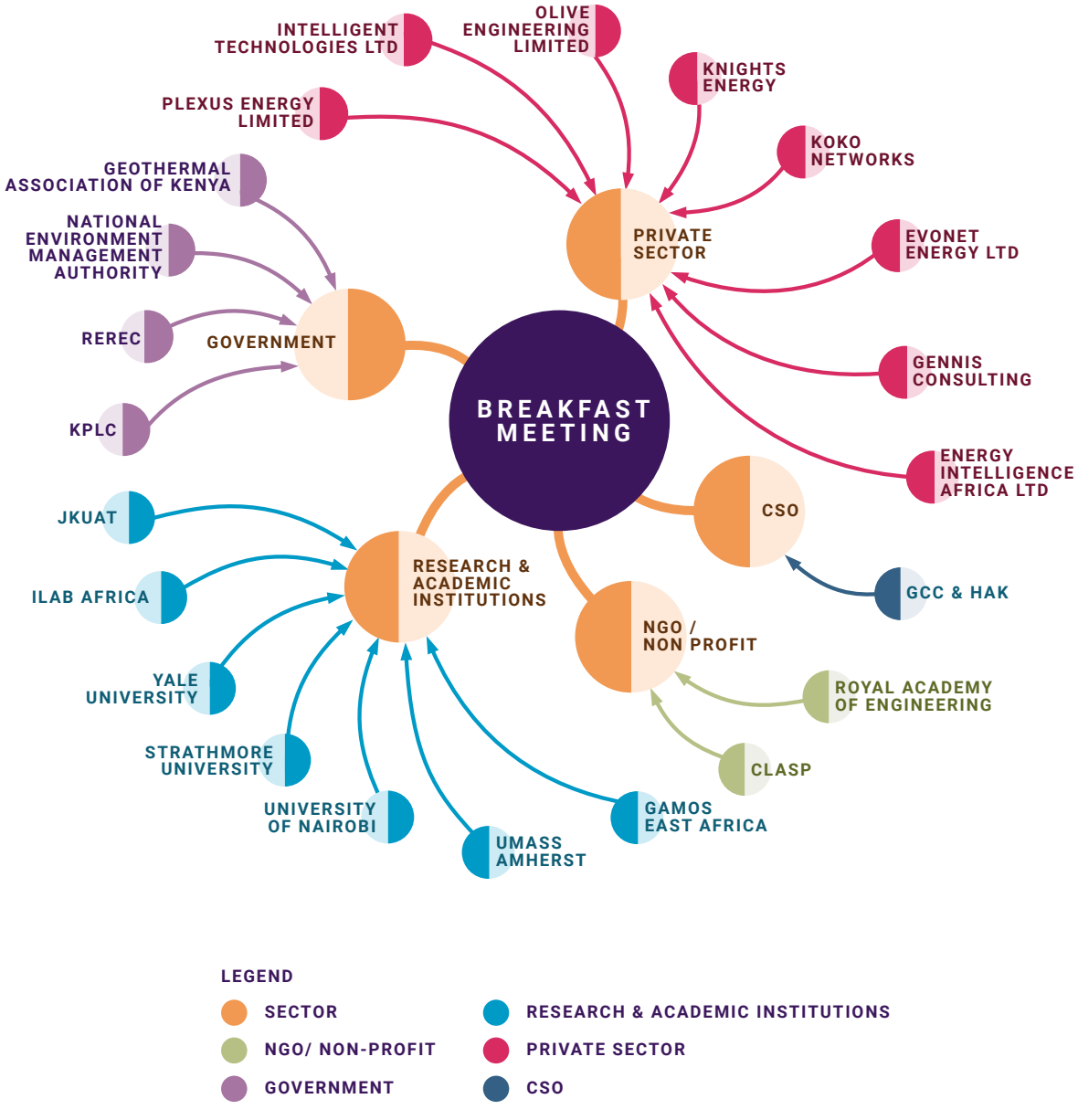


Figure 2-2: *Breakfast meeting stakeholders.*

2. Main Workshop on 5th July 2023

This workshop concentrated on presenting proposed recommendations derived from the research findings to stakeholders. Stakeholders were actively involved in reviewing and commenting on the recommendations and ensuring that they resonated with other stakeholders, especially policy makers. The feedback received

during this workshop further enriched the report's content and contributed to the development of actionable recommendations that address the complexities within the sector.



2-3: *Main workshop stakeholders.*

3. Review of the Electric Appliance Quality Ecosystem

This chapter provides a comprehensive examination of the quality ecosystem in Kenya, particularly focusing on the electric appliance sector, drawing from existing literature. It explains the concept of Quality Infrastructure (QI) and provides context on its pivotal role in ensuring product quality, safety, and environmental integrity, which are crucial for both domestic progress and international trade. The chapter then explores the international standards landscape, highlighting the contributions of the International Electrotechnical Commission (IEC) in setting benchmarks for the electrical industry.

Zooming into the Kenyan context, the chapter outlines the legal and regulatory framework that props up the country's QI, including key laws and institutions like the Kenya Bureau of Standards (KEBS) and the Kenya Accreditation Service (KENAS). It also elaborates on the processes of conformity assessment, market surveillance, and the role of various regulatory agencies in upholding quality and safety standards.

The chapter then looks at the complexities of the import process, the challenges faced by local testing laboratories, and the dynamics of the market and ownership of electrical appliances. It also touches upon critical policy areas such as consumer protection, combating counterfeits, and managing electronic waste through Extended Producer Responsibility (EPR).

In summary, this chapter offers a holistic view of Kenya's QI ecosystem, identifying both strengths and areas for improvement, particularly in the context of the burgeoning electric cooking sector. It lays the groundwork for the subsequent chapters, which look at specific challenges and opportunities within the electric cooking appliance market and propose recommendations to enhance its quality and safety.

3.1. What is Quality Infrastructure?

Quality infrastructure (QI) is the national ecosystem that includes policies, legal frameworks, and practices that ensure the quality, safety, and environmental integrity of goods, services, and processes [8]. Key QI components include metrology, standardization, conformity assessment, accreditation, and market surveillance. QI is

important for domestic and international trade, improving consumer confidence, fair competition, and efficient resource use. It supports sustainable development and enables access to foreign markets.

In the context of the electricity sector, QI ensures that electrical infrastructure, components, and appliances are safe, reliable, and efficient. The International Electrotechnical Commission (IEC) standards are a crucial element of QI, providing a framework for conformity assessment and ensuring interoperability of electrical products and systems globally. This harmonization promotes international trade and facilitates the adoption of best practices. The IEC plays an important role in developing and publishing international standards for all electrical, electronic, and related technologies. Through its technical committees, composed of global experts, the IEC establishes benchmarks for quality and safety in the electricity sector. Kenya, through Kenya Bureau of Standards, participates in IEC technical committees (TCs) to enhance the country's QI and improve the quality of its electrical infrastructure.

3.2. Quality Infrastructure in Kenya

3.2.1. Legal and Regulatory Framework

3.2.1.1. The Constitution and Key Laws

The Constitution of Kenya 2010, specifically Article 46, provides the foundation for consumer protection by guaranteeing the right to safe, healthy products and services of reasonable quality [9]. This constitutional right is put into practice through several key laws:

The Standards Act (Chapter 496) was enacted in 1974 and revised in 2012. This Act governs standardisation and conformity assessment, ensuring products and services meet specified requirements [10]. In the electricity sector, this Act is crucial for establishing safety and performance standards for electrical infrastructure, components, and appliances.

The Weights and Measures Act (Chapter 513) enacted in 1993 and revised in 2012, this Act establishes the legal basis for accurate measurements, ensuring fair trade and consumer protection [11]. In the electricity sector, this Act is vital for ensuring the accuracy of electricity meters and other measurement devices used in the power supply chain.

The Kenya Accreditation Service Act enacted in 2019, this Act establishes the national accreditation system, which assesses and recognizes the competence of conformity assessment bodies [12]. Accreditation is essential in the electricity sector to ensure that testing and certification bodies are qualified to evaluate the safety and performance of electrical products and installations.

These laws define the mandates of the primary QI institutions in Kenya as follows:

- Weights & Measures Department situated within the Ministry of Investments, Trade and Industry, this department is responsible for formulating policies related to measurements and standards.
- Kenya Accreditation Service (KENAS) accredits conformity assessment bodies, such as testing and certification bodies, to ensure their competence and impartiality. It promotes the acceptance of accredited bodies results both domestically and internationally.
- Kenya Bureau of Standards (KEBS) established in 1974, KEBS plays a central role in QI implementation and enforcement. Its functions include:
    - Developing and disseminating standards for various products and services, including those in the electrical sector
    - Operating product and system certification schemes to ensure compliance with standards.
    - Conducting market surveillance to monitor product quality and safety
    - Managing calibration laboratories to ensure traceability of measurements to international standards
    - Operating testing laboratories to evaluate product compliance.
    - Providing training and awareness programs on quality management

3.2.1.2. Technical Standards and Regulations

KEBS plays a central role in the development and implementation of standards in Kenya. It coordinates the creation of standards through Technical Committees (TCs) that

include diverse stakeholders. National Standards Council (NSC)[3] then decides which standards become official Kenyan Standards, published in the Kenya Gazette[4]. Compliance with these standards is voluntary.

However, the NSC can recommend mandatory standards to the Cabinet Secretary, who then issues them as Legal Notices in the Kenya Gazette, specifying compliance deadlines. The 2019 Standards Regulations also mandate that imported products adhere to declared Kenyan Standards.

Various regulatory agencies within different ministries incorporate these voluntary standards into their technical regulations, effectively making them mandatory within their sectors. In the electricity sector, the key agencies are:

- **Energy and Petroleum Regulatory Authority (EPRA)**
  Focuses on technical and economic regulation of the electricity, renewable energy, and petroleum sectors. It collaborates with other agencies to set and enforce standards for energy efficiency, product quality, and safety.

- **National Environment Management Authority (NEMA)**
  Oversees environmental policies and regulations. In the electricity sector, it plays a crucial role in managing electronic waste (e-waste) through policy development, regulatory compliance, and public awareness campaigns.

3.2.2. Technical Standards

Product standards are crucial for ensuring the safety, performance, and environmental sustainability of electric appliances. These standards, developed through collaboration between diverse stakeholders, set out requirements and test methods to verify various aspects like consumer safety, fair trade, and resource efficiency. In Kenya, 17 Technical Committees (TCs) handle electrotechnical product standards. Notably, KEBS/TC 90 focuses on electrical cooking appliances, aligning with international standards set by IEC TC 61 and IEC TC 59. This harmonization promotes both domestic safety and international trade.

[3] The NSC is appointed by the Cabinet Secretary for the Ministry of Investment, Trade, and Industry to supervise and control the administration and financial management of KEBs, advise the Cabinet Secretary, formulate matter of policy among other functions.

[4] The Kenya Gazette is an official publication of the Government of the Republic of Kenya. It contains notices of new legislation, notices required to be published by law or policy as well as other announcements that are published for public information.

3.2.2.1. Safety standards for electric cooking appliances

The use of electric appliances can expose individuals to various hazards, including electrical, mechanical, thermal, fire, and radiation risks. To mitigate these risks, safety standards are crucial in verifying that electric cooking appliances provide an acceptable level of protection. These standards typically outline requirements for mechanical design (protection against fire and moving parts), electrical design (protection against electric shock), environmental design (protection against water ingress and corrosion), and clear marking and user instructions.

In Kenya, safety standards are mandatory and serve as the foundation for the KEBS product certification scheme for electric cooking appliances. The specific safety standards applicable to different types of electric cooking appliances are detailed in Table3-1.

Table 3-1: *Safety standards for electric cooking appliances*

APPLIANCE	SAFETY STANDARD	SAFETY ASPECTS COVERED
Electric hot plates, Electric stoves, Induction cookers	KS IEC 60335-2-9:2019, Household and similar electrical appliances – Safety – Part 2-9: Particular requirements for grills, toasters, and similar portable cooking appliances	• Mechanical design: stability and mechanical hazards; mechanical strength; resistance to heat and fire. • Electrical design: classification with respect to protection against electric shock; temperature rise limits; leakage current; dielectric strength; protection against access to live parts; transient over-voltages; internal wiring; earthing; connections; clearances and creepage distances. • Environmental: IP rating; corrosion protection • Marking and user instructions • Abnormal operation • Software evaluation
Electric rice cookers, Electric slow cooker, Electric pressure cooker, Electric Multicooker	KS IEC 60335-2-15, Household and similar electrical appliances - Safety - Part 2-15: Particular requirements for appliances for heating liquids	
Electric cooking ranges	KS IEC 60335-2-6, Household and similar electrical appliances - Safety - Part 2-6: Particular requirements for stationary cooking ranges, hobs, ovens, and similar appliances	

3.2.2.2. Performance standards for electric cooking appliances

In addition to safety, performance standards are essential for evaluating the energy efficiency and cooking performance of electric cooking appliances. These standards define key performance characteristics and specify methods for measuring them, although they do not set mandatory performance requirements. The absence of mandatory performance requirements in Kenya shows the need for further development in this area. However, existing standards can still be utilized for comparative purposes, aiding consumers in making informed choices.

The performance aspects typically covered in these standards include heating time, energy efficiency, temperature control, sauté capability, simmer energy consumption, and standby power usage. REF _Ref175648690 \hTable3-2 provides a list of performance standards applicable to different electric cooking appliances.

Table 3-2: *Performance standards for electric cooking*

APPLIANCE	PERFORMANCE STANDARD	PERFORMANCE ASPECTS COVERED
Electric hot plates, Electric stoves, Induction cookers, Electric rice cookers, Electric slow cooker, Electric pressure cooker, Electric Multicooker	IEC 61817:2000+AMD1:2004 CSV, Household portable appliances for cooking, grilling and similar use - Methods for measuring performance	Specifies methods for measuring the performance of portable electric cooking appliances, electric hobs, and ranges. They do not give performance requirements. The following performance metrics are covered. • Heating up time • Temperature control • Energy efficiency • Cooking zone heat distribution • Standby energy consumption • Low power modes energy consumption • Dimensions and mass The tests specified are not considered reproducible as test results can vary between laboratories. They are therefore intended for comparative testing purposes only.
Electric hobs	KS IEC 60350-2:2017, Household electric cooking appliances - Part 2: Hobs - Methods for measuring performance	

APPLIANCE	PERFORMANCE STANDARD	PERFORMANCE ASPECTS COVERED
Electric ranges	KS IEC 60350-1:2016, Household electric cooking appliances - Part 1: Ranges, ovens, steam ovens and grills - Methods for measuring performance	Specifies methods for measuring the performance of electric cooking ranges, ovens, steam ovens, and grills for household use. The ovens covered by this standard may be with or without microwave function.
	IEC 60704-2-10:2011 Household and similar electrical appliances - Test code for the determination of airborne acoustical noise - Part 2-10: Particular requirements for electric cooking ranges, ovens, grills, microwave ovens and any combination of these	Provides procedures for the determination of the noise emitted by electric cooking ranges. Noise measurements are used for noise declaration among other purposes. This test code is concerned with airborne noise only

Currently, MECS is collaborating with the Global LEAP programme to develop a performance standard specifically tailored to the Kenyan context. This standard aims to address the current gap in mandatory performance requirements and promote the adoption of electric cooking appliances in Kenya. The 2020 Global LEAP Awards Electric Pressure Cooker Competition saw the development of a buyer's guide for best-in-class appliances for EPCs suitable for weak- and off-grid environments that is among the first attempts at specifying performance metrics for eCooking appliances [13].

3.2.2.3. Energy efficiency standards

In 2016, EPRA enacted Energy (Appliances' Energy Performance and Labelling) Regulations to enforce Minimum Energy Performance Standards (MEPS) for household electric appliances. The enforcement of these standards enhances the quality of electrical appliances in the Kenyan market and ensures that end-users receive value for their money. The MEPS currently cover appliances such as refrigerators, air conditioners, motors, and lighting.

eCooking appliances are currently not included in the MEPS scheme. This omission could hinder the uptake of eCooking technologies, as consumers lack information about the energy efficiency of different models, making informed purchasing decisions difficult. The absence of standards might also lead to the proliferation of inefficient

electric cooking appliances in the market, potentially increasing electricity costs for users and undermining the environmental benefits of eCooking.

3.3. Imports

3.3.1. Conformity Assessment

Conformity assessment is the process of verifying that a product, system, or service meets the requirements outlined in a standard or specification. These requirements can pertain to safety, performance, efficiency, or environmental impact. In Kenya, conformity assessment primarily involves inspection, testing, and certification.

3.3.1.1. Inspection

Inspection is the examination of a product to ensure it adheres to specified requirements. In Kenya, all imported products, including eCooking appliances, must undergo mandatory inspections before entering the market. The Kenya Bureau of Standards (KEBS) oversees this process, conducting both pre-shipment inspections at the source and destination inspections at the port of entry [14].

Pre-shipment inspections are carried out at the source through the Pre-Export Verification of Conformity (PVoC) program [14, p. 985]. The program is administered by third-party inspection agents, i.e. Messrs. Bureau Veritas, Cotecna, China Certification & Inspection Co. Ltd, Intertek International, SGS and QISJ, on behalf of KEBS [15]. Products are checked and tested in the exporting country, and a Certificate of Conformity (CoC) is issued for compliant products.

3.3.1.2. Mandatory Certification

Certification is the formal verification that a product meets specific requirements. KEBS manages product certification schemes for both locally manufactured and imported products. The product certification schemes are designed as per the guidelines given in ISO/IEC 17067:2013 document and accredited by KENAS [16]. Relating to electricity systems, KEBS issues the following quality marks under the following schemes:

- **The Standardization Mark (S-Mark)**
  is a mandatory mark for locally manufactured products that have passed rigorous testing and conformity assessment.

- **Import Standardization Mark of Quality (ISM)**
  is a mandatory mark for imported electrical goods, ensuring they meet the same standards as local products. Importers must provide a Certificate of Conformity (CoC).

- **Diamond Mark of Quality (D-Mark)**
  is a voluntary mark that recognizes manufacturers with exceptional product quality and manufacturing practices. It signifies superior quality and reliability.

3.3.1.3. Energy Efficiency Labels

The Energy (Appliances' Energy Performance and Labelling) Regulations of 2016 establish Minimum Energy Performance Standards (MEPS) for appliances in Kenya. Appliances that fail to meet these MEPS are prohibited from entering the market, while those that comply are labelled with a star rating system shown in REF _Ref175648962 \hFigure3-1 to indicate their efficiency to consumers. The star rating system, with a higher number of stars signifying greater efficiency, empowers consumers to make informed choices at the point of sale.

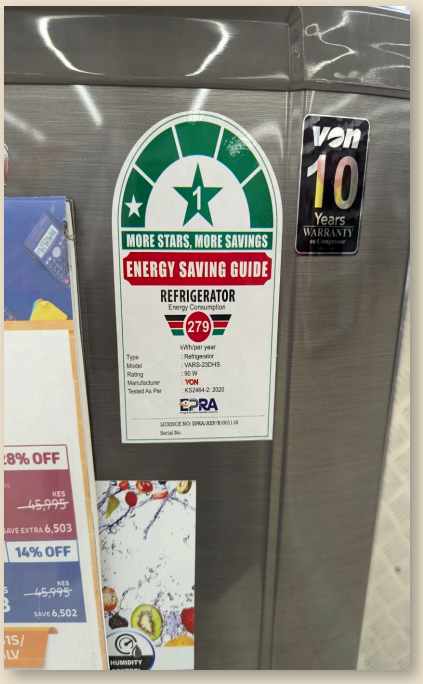


Figure 3-1: *Energy efficiency label on a fridge.*

The implementation of MEPS has led to the registration of over 1,000 appliance models and the removal of non-compliant products from the market. It has also made importing used appliances more difficult, contributing to a reduction in e-waste. However, it is important to note that eCooking appliances are currently not included in the MEPS scheme.

3.3.2. Voluntary Certification Schemes

The rapid advancement in electronics and off grid technologies, particularly in the Global South, has resulted in the development of products that may not yet have corresponding international standards. This creates a gap in the standardization process, as the development and adoption of international standards can be time-consuming. For instance, in the realm of eCooking, innovative appliances like solar-powered cookers or smart cookers with advanced features might not have readily available international standards to assess their safety and performance. In such cases, voluntary certification schemes play a crucial role in bridging this gap by offering testing and certification methods for these new-to-market products.

An example is the voluntary scheme for pico-solar products and solar home system kits named Verasol. Operated by CLASP (the Collaborative Labelling and Appliance Standards Program) in partnership with the Schatz Energy Research Centre, Verasol certifies pico-solar products and solar home system kits using international standards (IEC/TS 62257-9-8) for product quality, durability, and truth-in-advertising [17].

3.3.3. Importation Process

Most of Kenya's electrical products are imported thus undergo testing and certification in their countries of origin. Upon arrival in Kenya, agencies collaborate to process and clear the imported goods. These include KEBS, the Kenya Revenue Authority (KRA), the Kenya Ports Authority (KPA), and the Kenya Railway Corporation (KRC). Additionally, other relevant organizations, such as the Energy and Petroleum Regulatory Authority (EPRA).

Quality testing and certification outside Kenya's borders is done through the Pre-Export Verification of Conformity (PVoC) program. The program utilizes third-party inspection agents located in exporting countries to perform inspections, testing, and sealing of full-

load containers. The PVoC certification process prioritizes adherence to Kenyan standards. However, when specific Kenyan standards are unavailable, a hierarchical framework is used to ensure product quality and safety:

- **International Standards:**
  Such as those set by the IEC are considered.

- **Regional Standards:**
  If international standards are not applicable, regional standards specific to the product's country of origin are evaluated.

- **National Standards:**
  In the absence of regional standards, national standards within the origin country are considered.

- **Industry Standards:**
  If national standards are also unavailable, industry-specific standards within the origin country are considered.

- **Company Specifications:**
  As a final option, if no other standards apply, the product's own company specifications are used as the basis for evaluation.

Products that meet the required standards are granted a Certificate of Compliance (CoC) by third-party inspection agents, while those without a CoC are subject to mandatory inspection and testing at a local lab, typically KEBS. The CoC is essential for customs clearance at the port of entry and there are three main ways to obtain it:

- **Route A (Consignment Inspection and Testing)**
  mandates comprehensive testing and physical inspection of goods before export. It is particularly applicable to items like electrical cables.

- **Route B (Product Registration)**
  caters to products assessed as low-risk and demonstrating consistent quality, registration with the PVoC Agent is sufficient. Manufacturers must furnish test reports from the port of exit, eliminating the need for further testing at the Kenyan port of entry.

- **Route C (Product Licensing)**
  caters to manufacturers with robust quality management systems integrated into their production processes. Products under this route undergo random physical inspections by KEBS-designated inspectors before a CoC is issued. Additionally, manufacturers must provide traceable test reports linked to specific product batches.

Starting February 2022, KEBS attained recognition as an IECEE Recognizing National Certification Body (NCB). This recognition allows KEBS to accept IECEE test reports and certificates for a range of electrical and electronic products. As a result, products that have already undergone testing under the IECEE Scheme can now enter the Kenyan market without the need for further testing, as long as KEBS validates their Certificate of Conformity (CoC) under the IECEE CB Scheme. This streamlined process facilitates smoother market entry for compliant products.

3.3.4. Laboratories

Testing is a critical component of conformity assessment, and accredited laboratories play a key role in evaluating product compliance. The Kenya Accreditation Service (KENAS) has accredited numerous testing and calibration laboratories across various sectors [18]. However, there is limited capacity for testing electric cooking appliances. Therefore, expanding the capabilities of existing laboratories or establishing specialized facilities for eCooking appliance testing is crucial to ensure the safety and performance of these products as their adoption increases in Kenya.

3.4. Market and Ownership

3.4.1. Market Surveillance

Market surveillance involves activities by designated authorities to ensure products meet mandatory requirements and do not endanger the public. KEBS, through its market surveillance directorate, actively monitors products in the market, investigates consumer complaints, and acts against non-compliant products and their distributors. KEBS' 'Wajibika Na KEBS' initiative encourages public participation in market surveillance by providing platforms for reporting suspected substandard products.

Consumers can also verify the authenticity of KEBS quality marks through a KEBS self-service mobile app or SMS verification services as displayed in Figure3-2 and Figure3-3 respectively.

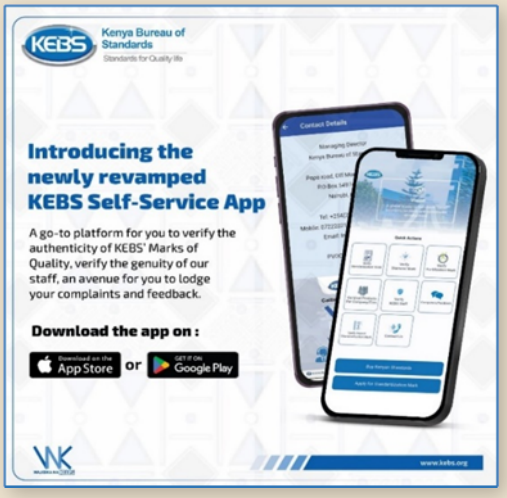


Figure 3-2: *A poster with details on the KEBS App*

Figure 3-3: *SMS verification to authenticate S-Mark, ISM and D-Mark*

3.4.2. Relevant Policies

3.4.2.1. Recourse for Poor Quality

Consumers impacted by substandard or counterfeit electrical appliances in Kenya can seek legal redress through the judicial system. However, the often lengthy and costly nature of court proceedings can discourage many from pursuing this option. To address this issue, the Kenyan Judiciary established the Small Claims Court (SCC) in 2017, aiming to improve access to justice by simplifying procedures, expediting case resolution, and maintaining affordable court fees [19].

The SCC has jurisdiction over various civil claims, including those related to contracts for the sale and supply of goods or services, money held or received, liability in tort for property loss or damage, compensation for personal injuries, and set offs and counterclaims under contracts. It was established as part of a broader effort to enhance the ease of doing business in Kenya by reducing the time and cost associated with resolving commercial disputes. The court's statutory timeline for case determination is 60 days, and its monetary jurisdiction is set at KES 1 million.

These strict timelines are meant to accelerate case resolution and could benefit claimants who have experienced issues with counterfeit or poor-quality appliances. Research on the extent to which the small claims court is being utilized in cases involving poor-quality appliances could shed light on its effectiveness in addressing this issue.

3.4.2.2. Counterfeits

A counterfeit is an item that uses someone else's trademark without their permission. A trademark is most often a word, phrase or symbol that identifies the source or origin of a particular good or service. The Anti-Counterfeit Act, No. 13 of 2008 is the primary law that governs and prohibits trade in counterfeit goods in Kenya [20]. It establishes the Anti-Counterfeit Authority whose mandate includes, among others, enlightening and informing the public on matters relating to counterfeiting and combating counterfeiting, trade, and other dealings in counterfeit goods in Kenya.

To combat counterfeiting more effectively, a significant problem in Kenya, the Anti-Counterfeit (Recordation) Regulations were gazetted in 2021 [21]. The regulations require owners of intellectual property rights (IPRs) who wish to import goods into Kenya to record their IPRs with the Anti-Counterfeit Authority. The Authority keeps a register of all such IPRs to facilitate the identification of the genuine goods thereby helping stem the importation of counterfeit goods into the country.

Kenya's Anti-Counterfeit Authority found that the energy, electrical and electronics sectors is among the most vulnerable sector to counterfeiting [22]. The report findings indicated that main problem with counterfeiting lies in its ability to tarnish the reputation of a company and erode consumer confidence in authentic products, fostering distrust towards products from reputable brands. Additionally, counterfeits are frequently

produced with low-quality, inferior, and potentially hazardous components, posing significant risks to public health and consumer safety. While specific data on counterfeiting within the eCooking sector may be limited, its prevalence in the broader electrical and electronics market suggests a potential threat. As the cooking appliance market expands, the risk of counterfeit products entering this sector is likely to increase.

3.4.2.3. Electronic Waste

The Sustainable Waste Management Act No. 31 of 2022, currently under revision, introduces the crucial concept of Extended Producer Responsibility (EPR) to Kenya's legal framework for waste management [23]. EPR shifts the responsibility for a product's end-of-life handling from the consumer to the producer, encompassing entities involved in manufacturing, importing, and various stages of product handling within Kenya.

Draft EPR Regulations are currently ongoing and aim to clarify implementation details, but the Act's EPR requirements are already in effect, urging producers to take proactive measures. To manage diverse waste categories, producers are expected to establish Producer Responsibility Organizations (PROs), assuming legal responsibility for EPR compliance on behalf of their members. Notable examples of existing PROs include PETCO for PET recycling and KEPRO for non-hazardous packaging waste. While initiatives like Kenya Renewable Energy Association (KEREA)'s efforts in the energy sector are valuable, they are not directly relevant to the electrical appliance sector, emphasizing the need for targeted EPR solutions in this area.

4. Analysis of the Kenyan Electric Appliance Quality Ecosystem:

Findings from the Interviews, Workshops and Household Survey

Chapter 3 presented the ideal electronic appliance quality ecosystem as envisaged through relevant bodies and existing policies. It thus describes how the ecosystem and its actors should operate. This chapter discusses the electric appliance quality ecosystem as implemented in Kenya, which encompasses how each segment, and its actors actually operate based on the findings of this research. The realities of the electric appliance quality ecosystem in Kenya is represented by stratifying it into its constituent supply chain segments and the actors in each segment, as shown in Figure 4-1.

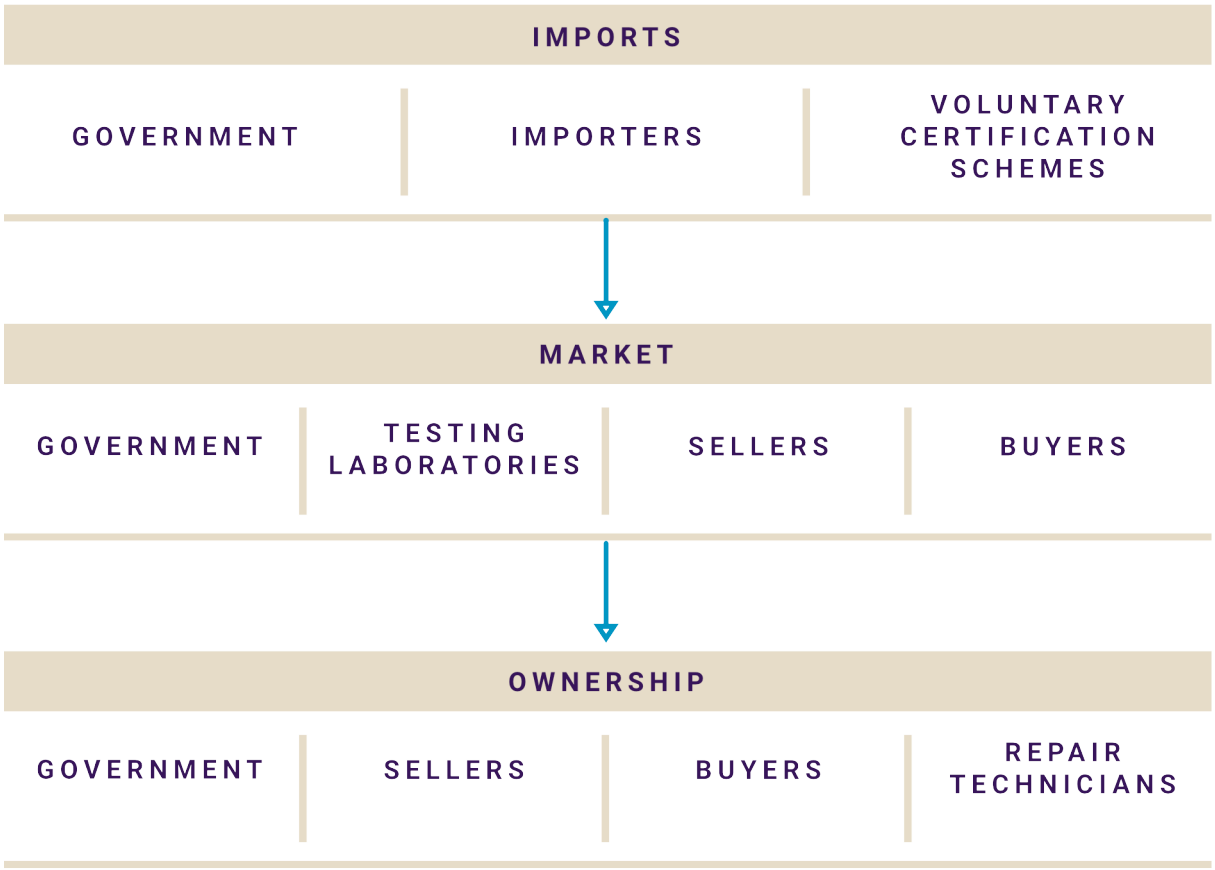


***Figure 4-1**: Supply chain segments and ecosystem actors.*

4.1. Imports

The 'Imports' section of the report highlights discrepancies between the ideal and actual implementation of import procedures for electrical appliances in Kenya. The Pre-Export Verification of Conformity (PVoC) program, designed to ensure quality control before products reach Kenya, faces challenges due to practices such as the importation of defective goods rejected by other countries and the issuance of Certificates of Compliance (CoCs) without proper testing. The complexity of shipping containers with mixed goods and understaffing at ports further complicate the inspection process. The Verasol voluntary certification scheme, primarily used by development sector actors, offers a solution by providing testing and certification for new-to-market products and addressing the issue of CoCs issued without testing.

4.1.1. Importers

During Key Informant Interviews (KIIs) with importers, several deviations from the ideal ecosystem were noted. Importers from developing countries like Kenya, often acquire goods that have been rejected by nations in the Global North due to defects. These defective products, despite failing laboratory tests, are sometimes still granted a Certificate of Compliance (CoC) and shipped to countries like Kenya.

> *"When you go to the factory, they ask you where your customer is from. If he/she's from the third world, they know that the government won't come to hold them accountable if the cooker exploded. They don't care. In other markets it's tough i.e. European standards, American standards"*
>
> ***~ Importer based in Kenya***

Importers mentioned that in some cases, especially with goods from China, there is no comprehensive testing in the country of origin. The only checks conducted are physical inspections, primarily for tax assessment purposes. After this inspection, third-party agents issue the CoC.

> *"After the goods arrive at the port, they are transferred to the Inland Container Depot and entered into the system, after which customs duty is paid. The goods are then handed over to the Kenya Bureau of Standards. It is within their jurisdiction to open the containers and inspect the goods, but they can be bribed not to."*
>
> ***~ Importer based in China***

> *"Now KEBS say that they are coming to put their stickers for quality on your goods. There's someone you have to pay. The KRA agent – before your goods leave there (China) there's some documents that you have to have sent to KRA for them to tell you the kind of taxes you're going to pay on this side. They don't do the inspection."*
>
> ***~ Importer based in Kenya***

Additionally, the issue of counterfeit goods was raised. Some importers engage in practices like renaming or rebranding products (e.g., using 'GUGGI' instead of 'GUCCI'). Others ship brand stickers separately then attach them to products once they arrive in Kenya, further complicating the quality control processes.

4.1.2. Government

At the port of entry, the government agencies responsible for conformity assessment as specified in Section 3.3.1, rely on the Certificate of Compliance (CoC) to assess the quality of goods. If a CoC was issued on defective goods, they would be duly cleared and allowed into the country, through no fault of the government employees who are using the CoC as a quality signal, which is its intended purpose.

The Key Informant Interviews revealed a challenge related to the diverse content of shipping containers entering countries like Kenya. Due to smaller individual order volumes, a single container often carries a mix of items such as clothing, electronics, and more. This contrasts with countries placing large orders, where containers typically transport similar items, like electronics only. The variety within each container complicates the task for inspection agency employees, making it challenging to physically verify that each item or batch has its own CoC.

> *"When it comes to consolidation, especially for markets like those in Europe, its usually big companies importing from China. They don't typically consolidate shipments like you might see with electronics in places like Nyamakima (Nairobi), where smaller traders might have 10 boxes of mixed items. In such cases, a single container could have a diverse mix of goods—clothing, electronics, and so on. Even if you hire SGS (Société Générale de Surveillance) to handle the inspection, they wouldn't be able to effectively manage the consolidation due to the variety of items. As a result, they might just ask for money without accomplishing much."*
>
> ***~ Importer based in China***

> *"There are two things. First, what we discussed about the conflict between standards and revenue agencies is very true. That's why most of the products that were not being cleared had not met*

the requirements. These products often come in containers with small quantities of everything for everyone."

~ Key Informant: Government Agency

Furthermore, it was noted that some goods intended for markets with less stringent enforcement are routed through the Kenyan port. Traders sometimes declare these goods for other markets but offload them in Kenya while in transit. Subsequently, either empty containers or those with different contents from the original loading are sent to the next border point. These containers are then recorded as having exited Kenya, a mandatory procedure for goods intended for other countries, further complicating the tracking and regulation of imports.

"As long as we have differing requirements, with Kenya requiring one standard (the IEC standard) and Uganda requiring a different one, we'll continue to face challenges. Products designed for Uganda meet a lower standard than those expected in Kenya. Yet, there's demand in Kenya as well. Kenyans will import products supposedly destined for Uganda, but they rarely reach there. Instead, they end up in Nairobi, Eldoret, and Nakuru. The trucks may go all the way to Uganda, and if you check at the border point, it appears they've crossed over. But in reality, the products remain in Kenya."

~ Key Informant: Government Agency

Another problem, highlighted during stakeholder workshops, is the understaffing of government agencies at the port. This shortage of personnel means that, despite the dedication and integrity of the staff, a significant amount of goods might enter the Kenyan market unchecked.

> *"They (workers at the ports) don't have the manpower to check every container, so most of the time, no one knows what's inside the containers. This is what the former president's government (President Uhuru Kenyatta) was trying to address, and that's why a lot of businesspeople were very angry because they said that every single container must undergo inspection. At one point, I had 70 containers waiting for almost a year because there was no manpower."*
>
> ***~ Importer based in China***

4.1.3. Voluntary Certification Schemes

The Verasol scheme, as detailed in Section 3.3.2, emerges as the most relevant voluntary certification scheme. Insights from the workshops indicate that the Verasol Scheme is predominantly utilized by development sector actors in Kenya, with its certification mark being widely recognized by these stakeholders. This recognition is crucial, especially considering the significant investments by development agencies and programs, like the World Bank and Modern Energy Cooking Services, in expanding appliance adoption in the Global South.

In the context of the import segment of the supply chain, the Verasol scheme, through its accredited laboratories, offers a solution to the issue of third-party agents issuing Certificates of Compliance (CoCs) without conducting proper product testing. The Verasol scheme also addresses the challenge of testing new market entrants that lack established testing methods, as discussed in Section 3.3.2. By providing these test methods, the scheme ensures the quality of novel goods while the adoption of IEC standards is in progress. This approach facilitates quality assurance for products that do not yet have specific standards, bridging a crucial gap in the current standardization framework.

4.2. Market

This section looks at the actual implementation of quality control measures in Kenya's electrical appliance market, contrasting it with the idealized system. It highlights the limited consumer awareness and utilization of KEBS quality marks, despite the majority being aware of them. The section points out inconsistencies in KEBS' self-service quality validation process, making it unreliable for consumers. The comparison between KEBS and KEPHIS quality marks reveals that the latter's system, with its additional details in verification responses, is more effective in detecting counterfeit products. The section explores buyer-seller dynamics which reveals that most consumers purchase appliances in urban areas based on social recommendations rather than technical knowledge, highlighting the influence of social networks in purchasing decisions. The section also notes that while most consumers receive warranty information, their understanding of it might be limited.

4.2.1. Government

Based on the household survey (n=306), consumer knowledge and usage of the KEBS quality marks was found to be 73% and 59% respectively as shown in Figure4-2.

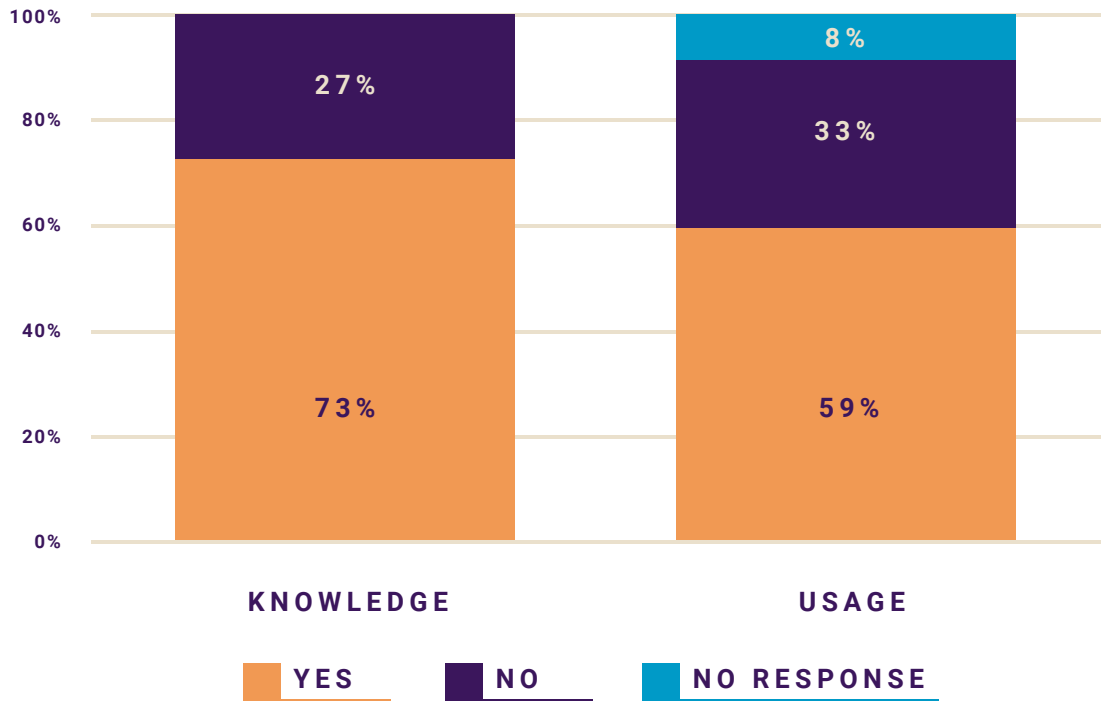
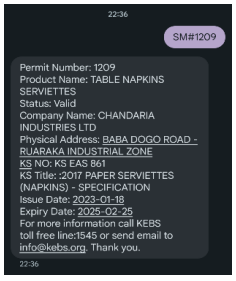
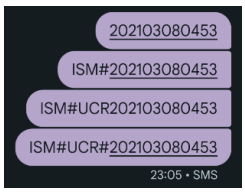
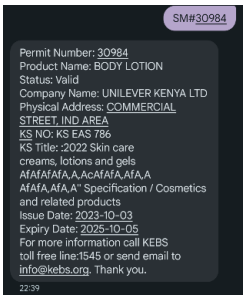
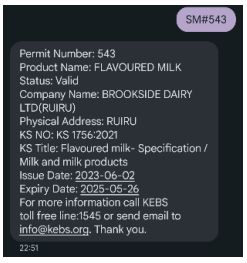


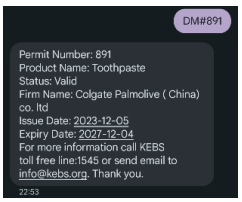
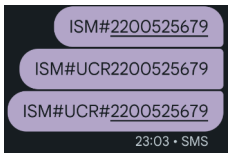
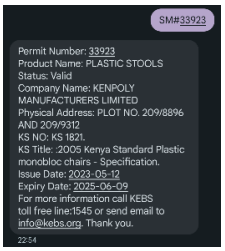
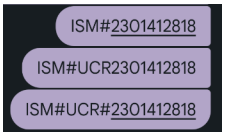
***Figure 4-2**: Knowledge of the KEBS mark.*

This indicates that majority of households are aware of the KEBS quality mark but fewer use the quality mark when making the purchase. Of note is that the respondents

interpreted “usage” to mean “looking at the sticker”. However, proper utilization of the quality mark involves more than just acknowledging its presence. A purchaser should confirm the sticker's authenticity and ensure it has been officially issued by KEBS. The process for this verification done through the KEBS Self-Service app (Figure3-2) or SMS Verification Service (Figure3-3). The report evaluated the effectiveness of the verification method by sending the codes from KEBS stickers on different household products available in the Kenyan market to the KEBS SMS verification service USSD code 20023. The results from the evaluation are presented in Table4-1. The results show inconsistencies in the KEBS self-service quality validation process, where some items had no response of whether the product was valid. In particular, none of the eCooking appliances has a response on their validity. This creates a challenge for consumers seeking a dependable way to verify the quality of their electrical products. It shows the need for KEBS to improve the consistency and reliability of its validation service to provide consumers with a trustworthy tool for ensuring product safety and quality.

Table 4-1: *Verifying stickers for different household products.*

PRODUCT	SERVIETTE	PAPER	LOTION	MILK
Product KEBS Sticker				
KEBS verificaiton SMS response		**No Response:** 		

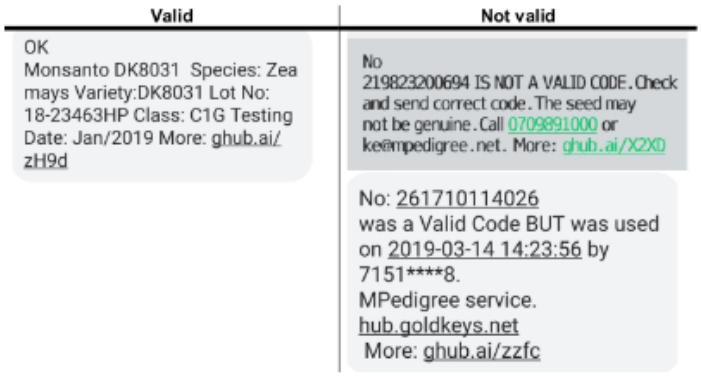
PRODUCT	TOOTHPASTE	T-SHIRT	PLASTIC STOOL	BLENDER
Product KEBS Sticker				
KEBS verification SMS response		No Response: 		No Response: 

PRODUCT	GAS BURNER	ELECTRIC GRILL	ELECTRIC HOT PLATE	ELECTRIC PRESSURE COOKER
Product KEBS Sticker				
KEBS verification SMS response	No Response	No Response	No Response	No Response

4.2.1.1. KEBS vs Sector Specific Quality Marks

As indicated in Table 4-1, the quality mark from KEBS is applied across a broad range of products and items, without sector-specific differentiation. In Kenya's quality infrastructure ecosystem, there exists another quality mark issued by a government body, specifically the Kenya Plant Health Inspectorate Service (KEPHIS). This mark denotes the quality of seeds. In contrast to the KEBS quality mark, the KEPHIS quality mark is exclusively used to indicate seed quality, allowing for the easy provision of sector-specific information. A comparative analysis was carried out to evaluate the effectiveness of these two systems in terms of their ability to aid in the detection of counterfeit products as shown in Figure4-3 and Figure4-4.

Figure 4-3: *KEBS invalid code response.*



Top left: **OK**
– denotes genuine seeds plus a code that is being queried for the first time.

Top right: **No**
– denotes code that cannot be found on the KEPHIS database.

Bottom right: **No**
– denotes genuine seeds plus a code that has been queried before.

Figure 4-4: *KEPHIS SMS verification response*

The KEPHIS quality mark, in contrast to the KEBS quality mark, incorporates additional details indicating whether the verification is being conducted for the first time or if it is a subsequent check. It does this by distinguishing between two specific types of invalid codes which reflect "can't be found" and "was queried before". As a result, the response mechanism used by KEBS lacks the comprehensiveness found in the KEPHIS system.

While KEBS will notify users when a sticker is not present in their system, it does not provide information on how many times that sticker has been verified. It is important to recognize that KEBS distributes stickers based on batches rather than individual products, which makes the application of the KEPHIS validation method impractical for KEBS stickers. In contrast, the KEPHIS approach, with its verification process, significantly improves the ability to detect counterfeit products. There needs to be a revision of the national quality mark system, particularly to address the needs of electrical appliances. We provide a couple of suggestions for the way forward in the recommendations chapter 5.1.1.

4.2.2. Testing Laboratories

The next crucial step in the quality value chain is market surveillance. In Kenya, this surveillance should be conducted by electrical testing laboratories, including those operated by government agencies and private sector. However, as highlighted in Section 3.3.4, and corroborated by KIIs, there is a notable limitation in testing capacity for electrical appliances.

> *"Another issue is developing the capacity for testing. Indeed, we need many testing labs, but not just any testing labs—they must be accredited, with their capability and competence thoroughly evaluated."*
>
> ***~ Key Informant: Government Agency***

> *"Securing infrastructure funding is typically challenging. The electrical calibration field is particularly technical, with higher associated risks compared to other areas. The electrical component itself often raises concerns among potential investors, making them more hesitant to invest in this field."*
>
> ***~ Key Informant: Testing laboratory***

KEBS is tasked with quality control of a wide range of products including food and electrical appliances. Given the critical nature of food and water safety, the agency prioritizes these areas, often at the expense of developing adequate capacity and infrastructure for electrical appliance testing. This imbalance is further compounded by the Kenyan government's policy requiring the agency to generate its own funding, instead of relying on allocations from the National Treasury. Since food and water testing demand lower investment in infrastructure and capacity, they offer a higher return on investment compared to electrical appliance testing. Electrical appliance

testing is a relatively new field, where establishing the necessary support infrastructure is more costly due to the requirement of building from the ground up.

Private testing laboratories noted that the cost of equipment, capacity development and calibration are high considering the expected returns from testing. This disincentivizes the setup of testing laboratories as an investment. To address this shortfall in laboratory infrastructure, development organizations have stepped in to establish testing facilities within their relevant sectors, such as solar. However, a substantial portion of funding for these laboratories is directed to facilities outside Kenya and Africa, contrasting with the limited financial assistance available to local laboratories. This uneven distribution of financial support presents a major obstacle for Kenyan laboratories, slowing the improvement of local testing capabilities and infrastructure.

4.2.3. Buyers and Sellers

The buyer-seller relationship forms the core of any market, and the electrical appliance market in Kenya is no exception. Understanding the dynamics between buyers and sellers provides valuable insights into consumer behaviour, purchasing patterns, and the overall market landscape. This information can help policymakers and regulators identify areas for intervention to ensure fair trade practices and consumer protection.

From the household survey we found that the total number of electrical appliances owned by the households (nh=306) was na=714, with the distribution being as shown in Figure 4-5.

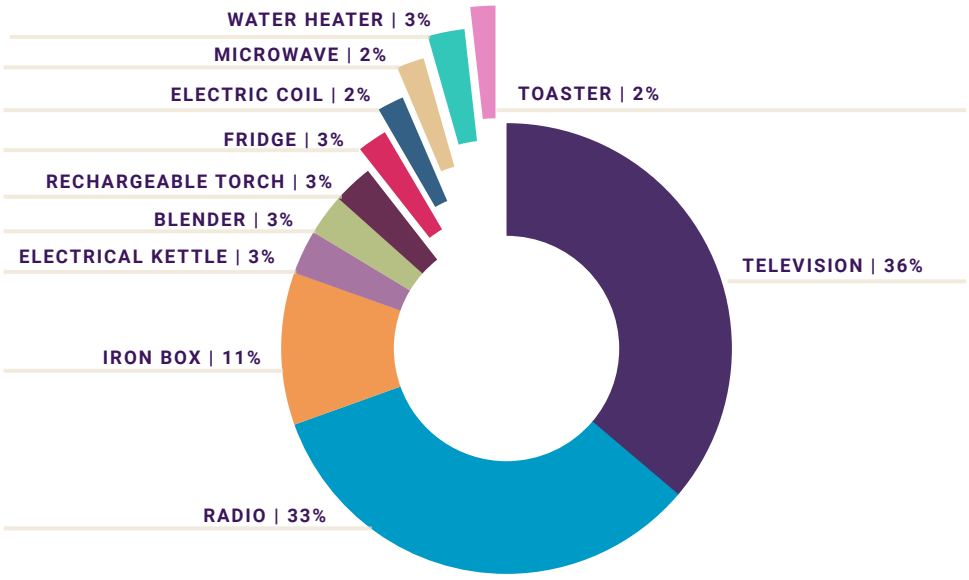


Figure 4-5: *All household appliances.*

The survey results in Figure4-6 show that most consumers acquired their appliances in cities or major towns, suggesting that urban areas are the primary location for electrical appliance purchases. (na=714)

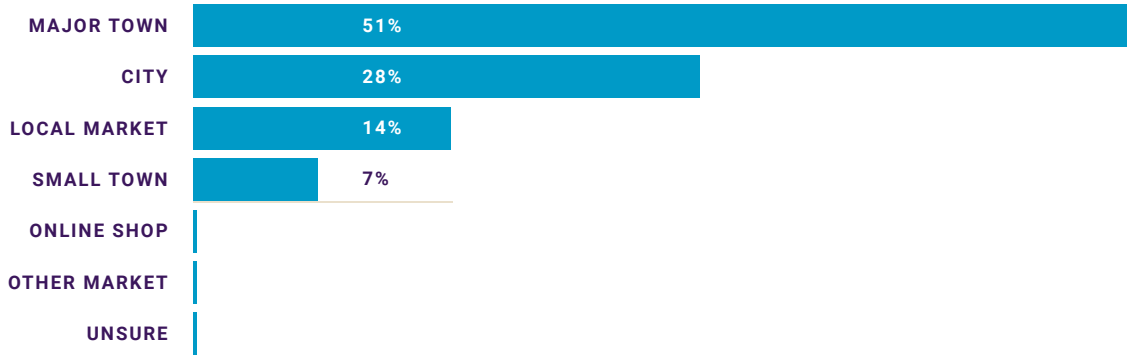


Figure 4-6: *Purchase location.*

Most consumers (78%) chose to buy their appliances either after seeing someone else with the product or following recommendations from family and friends as shown in Figure4-7. This trend suggests that social networks play a more significant role in influencing appliance purchases than technical knowledge or other factors. (na=714)

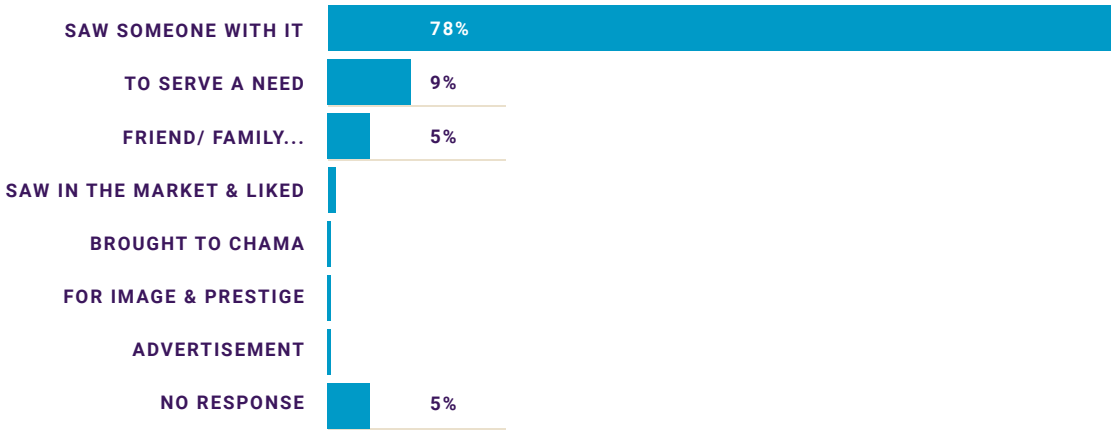


Figure 4-7: *Reason for purchase.*

Most households purchased their appliances on a cash basis using income from harvest as shown in Figure4-8 (na=714). This is indicative of the study sample which was from predominantly rural areas.

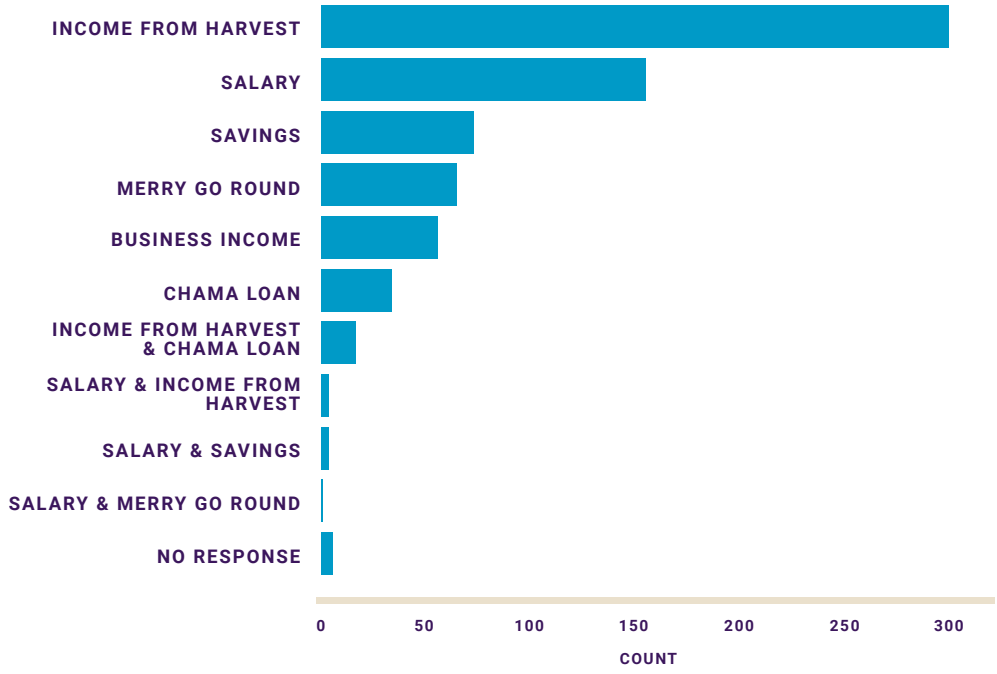


Figure 4-8: *Source of income.*

Buyers in this market are also price sensitive also lack knowledge on quality, which leaves them susceptible to buying counterfeit or poor-quality products.

> *"One of the key challenges on the end user end is basically the knowledge, or rather the information about the products. Cause you realize that there are a lot of products, say for instance, the electric pressure cookers. There are a lot of brands that are available in the market. And you realize that mostly the users, they do not know what to look into when they're picking an appliance or rather, what is the qualifier that the appliance is quality. And, in most cases you, you realize that the, the end users rather the customers, they would go for the price and not the quality... So, most of them tend to just focus on the price and not the quality. And we wouldn't also blame it on them because*

they don't know what aspects you're supposed to look into when you're considering quality"

~ Key Informant: Testing Laboratory

"So, the biggest solution also lies in public education about the fact that you are not saving by buying cheap, substandard products. But the public, of course, will argue back and say, why are they in this market? And who is responsible for them to come in this market? That's why it goes back to the regulator and the enforcers to make sure that the product that comes in here has actually been tested in accredited labs, wherever they're coming from"

~ Key Informant: Government Agency

From the survey, households reported receiving warranty information when purchasing their appliances as shown in Figure4-9. 70% of them found this information provided by sellers to be useful for operating their appliances. (na=714).

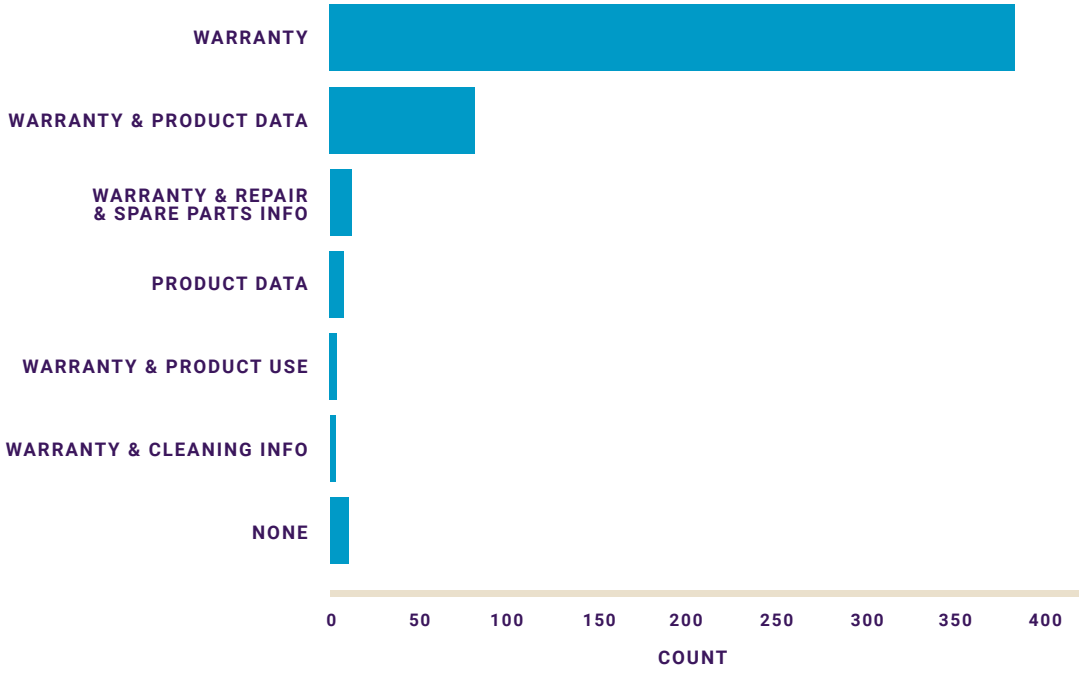


Figure 4-9: *Document received.*

An important point regarding warranty, the survey did not clarify respondents' interpretations of the term 'warranty.' Past research indicates that one cannot presume all respondents grasp 'warranty' in its formal sense. For example, in a study concerning plug and play solar photovoltaic systems, some participants equated simply seeing the word "warranty" on the product packaging with having an actual warranty provided at the time of purchase [24]. This finding is also corroborated from the key informant interviews.

> *"Most end users do not take time to probably just go through the warranty and understand the scopes to which the warranty covers."*
>
> ***~ Key Informant: Testing Laboratory***

4.3. Ownership

This section explores the lifespan of electrical appliances, the first point of failure, and consumer responses. It highlights challenges in coordination and enforcement among government entities responsible for consumer protection. The legal framework, with its lenient penalties for quality violations, is deemed inadequate. The section shows the importance of the repair ecosystem, as consumers rely on local repair technicians after warranties expire. However, the low rate of repairs suggests a lack of repair infrastructure and awareness. The section concludes that addressing these challenges necessitates a multi-pronged approach, encompassing strengthening the repair ecosystem, improving consumer awareness, and enhancing legal and policy frameworks.

4.3.1. Government

The key government entities involved in consumer protection are KEBS, EPRA, ACA, and the Judiciary, and their functions are detailed in Section 3.2.1. A primary concern highlighted during the KIIs is a lack of coordination among these actors.

> *"Before we begin the clearance process, we should deal with KEBS instead of KRA. Currently,*

when goods arrive at the port and are transferred to the ICD at Embakasi, the first agency you deal with is KRA. They require you to pay a certain amount before proceeding to the next step, which involves the Kenya Bureau of Standards (KEBS). I've always believed it should be the other way around—we should start with the Kenya Bureau of Standards. At that stage, I wouldn't need to pay duty yet. Because if KRA allows me to proceed after paying taxes, and then KEBS flags the goods for any reason, I would incur losses on both the goods and the taxes paid, which are not refundable."

~ Importer based in China

Additionally, the workshops revealed that litigation (the judiciary) can be protracted and costly for both consumers and companies seeking redress for substandard products or counterfeit goods. Findings from the workshops also raised concerns regarding the adequacy of Kenyan consumer protection laws for electrical appliances. The issue lies in the relatively minor penalties stipulated by Kenyan legislation, which are minimal compared to the potential profits from selling these products. This disparity can deter enforcement agencies from pursuing offenders, as the legal framework may not be sufficiently updated to provide the necessary consumer protection within the electrotechnical sector.

4.3.2. Buyers and Sellers

Understanding consumer behaviour once an appliance fails and warranty utilisation can reveal awareness gaps and evaluate warranty effectiveness. This would enable manufacturers to improve their offerings, support informed policymaking, and a more consumer-centric appliance market.

As summarised in Figure4-10, households reported that appliances (na=468)[5] can be returned to the seller under warranty for a period of 1 year. This suggests that they are familiar with a standard 1-year warranty for most products. Beyond this period, local electricians are typically sought for repairs. Notably, none of the households cited manufacturer repair centres as an option for repairing their electric appliances.

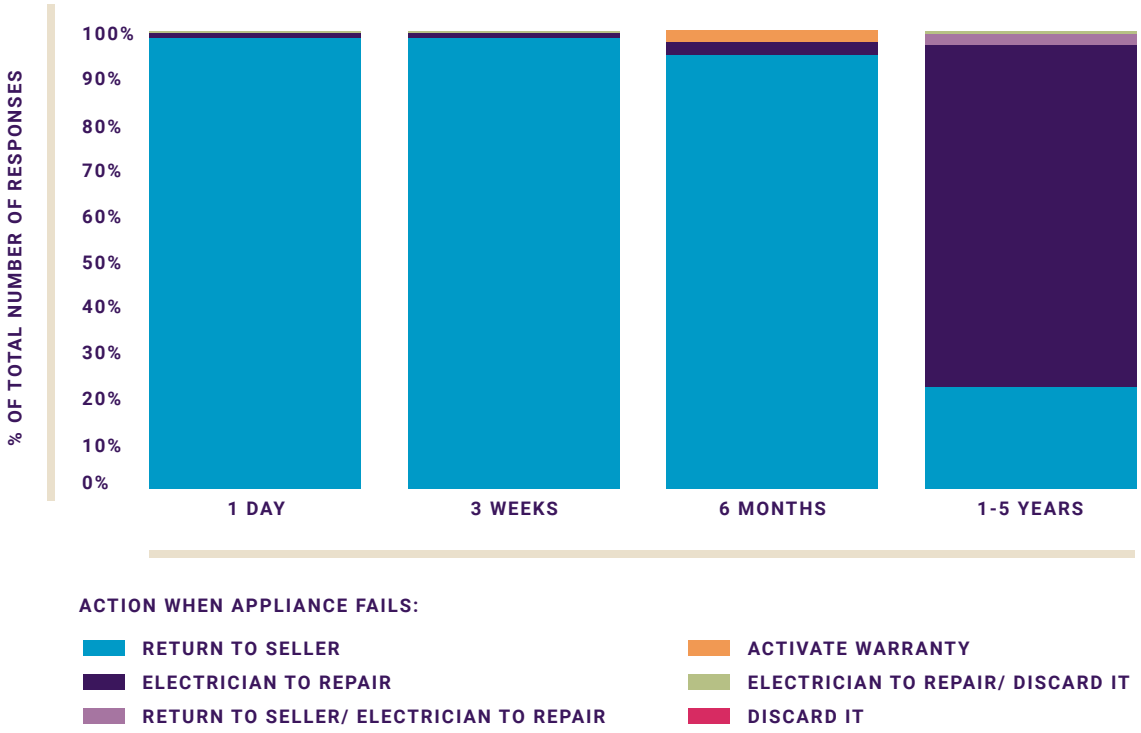


Figure 4-10: *Survey results on consumer behaviour once an appliance fails.*

4.3.3. Repair Technicians

The common products that households reported a failure are summarised in Figure4-11 (na=132). Of the households that experiences a failure, majority took their appliances to local electricians for repair. Herein referred to as repair technicians to differentiate their services from those of electricians who provide electrical wiring services.

[5] Due to the survey structure, 246 households did not respond to these questions.

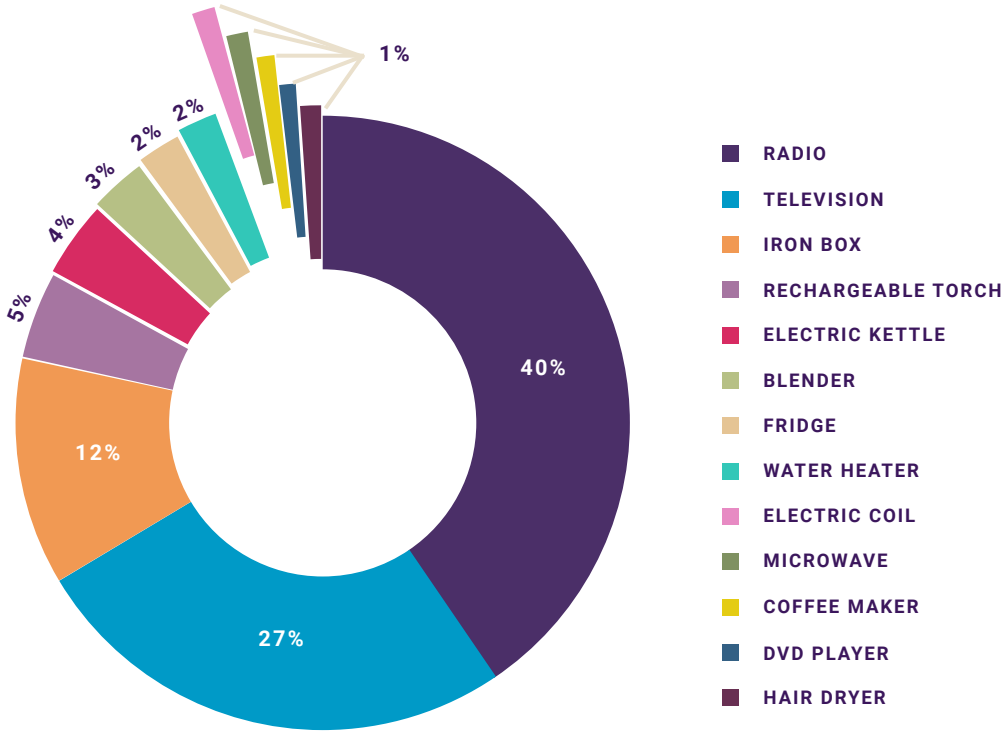


Figure 4-11: *Failed appliances.*

At least 83% of the households that reported a failed appliance indicated that they would take their failed appliances to a repair technician as shown in Figure 4-12 (na=132). This finding place local repair technicians as a key element in the electrical appliance quality infrastructure ecosystem.

Figure 4-12: *Repair location after failure.*

However, households that had an electric appliance failure also reported that they attempted the first repair for only 31% of the appliances and contacted the seller for 35% of the failures. The low rate of repairs for failed electrical appliances indicates a low interest or willingness to try to repair the appliances, which, according to the workshop sessions, is an indication of lack of repair infrastructure.

The frequency of repair of common household electric appliances differs by appliance as show in Figure 4-13 sourced from the Cambridge Repair Café. However, the repair ecosystem is often fragmented, with different institutions developing their own repair format. For example, a cooling program will try and develop a repair ecosystem separate from a cooking program, or a cooker company separate from another cooker company. While this makes sense from a funding perspective i.e., different institutions have different priorities, it is removed from the reality that users exist.

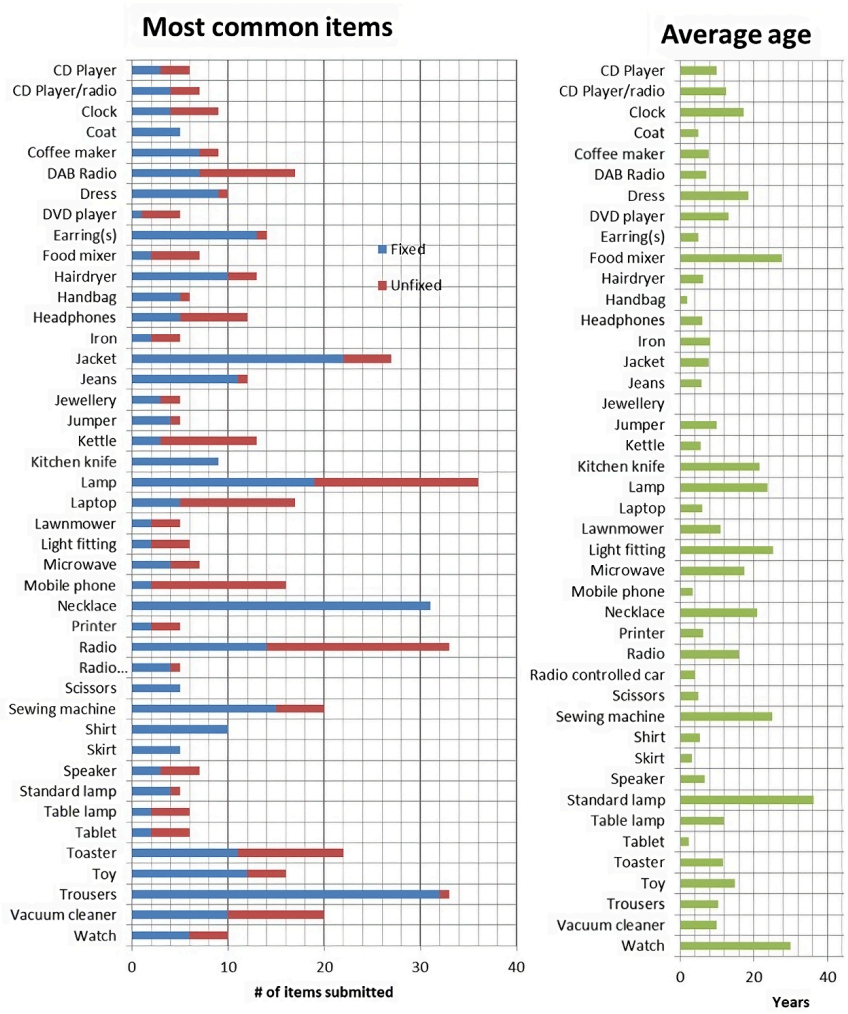


Figure 4-13: *Cambridge Area Repair Cafe Group: Common product types.*

Additionally, the increasing reliance on computer software in most smart products today adds complexity to repairs as newer electrical products often go unrepaired as shown in Figure4-14. This complexity arises because software is often designed to be enigmatic, a measure taken to safeguard the company's intellectual property rights (IPRs) and enhance system security. Such protective measures can be leveraged as justification to restrict consumers and their local repair technicians from exercising their right to repair.

Furthermore, systems might require ongoing maintenance by the IPR holders, creating a dependency on them. In cases where the company stops supporting the product, the consumer is left with no choice but to purchase a new product, as they are unable to access repair services elsewhere. This phenomenon, known as software obsolescence, is increasingly problematic as more electrical products integrate digital technology.

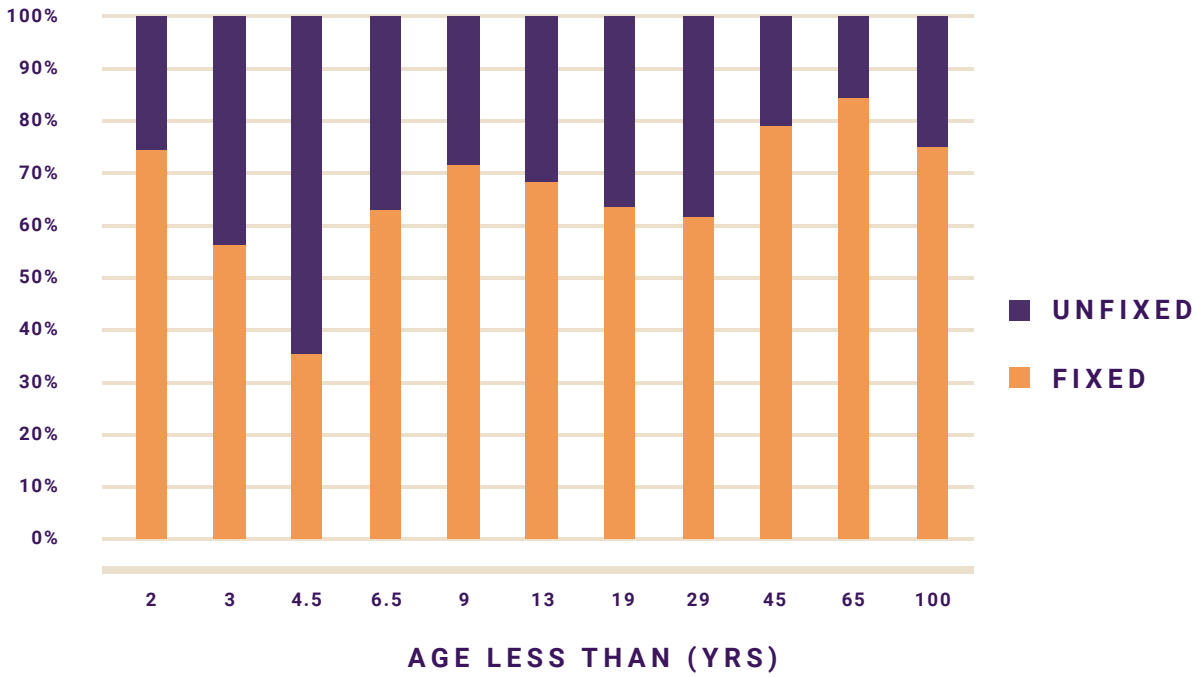


Figure 4-14: *Probability of fixing an electric appliance vs age*[6]

4.3.4. Wiring Electricians

During the study, the issue of appliance failure was investigated. The failure can result from the appliance's quality, a topic thoroughly addressed in this report. Additionally, consumer behaviour, such as improper use or misuse, can lead to failure. However, two significant causes of appliance failure that this study did not extensively examine are the quality of electricity from the grid and substandard wiring often installed by untrained or inadequately trained electric technicians. The extent of these issues and recommendations are explored in Wambugu et al. (2024) [25].

[6] Sample size: 986 items brought to Cambridge Area Repair Cafés, Feb2017 - Feb2019 (some ages estimated)

5. Recommendations for the eCooking Appliances Quality Ecosystem

5.1. Recommendations

This section presents actionable recommendations to improve the quality ecosystem for electric cooking appliances in Kenya. These recommendations aim to facilitate the adoption of good-quality appliances and could be incorporated into the government's National eCooking Strategy. All relevant stakeholders should be involved in their development and implementation to ensure diverse perspectives are considered and lead to more effective, sustainable outcomes.

While these recommendations are tailored to the Kenyan context, the underlying principles, and approaches such as collaboration, consumer education, and robust quality assurance mechanisms can be adapted and applied to other regions seeking to improve their electric cooking appliance ecosystems. However, specific adjustments may be needed to account for local regulations, infrastructure, and consumer behaviours.

5.1.1. Quality Marks

The existing KEBS quality mark is not used solely for electric appliances and components. This issue is detailed in Section 4.2.1, where it is noted that a single quality mark is currently used across a range of products. The primary shortcoming of this approach is its inability to convey the specific technological details and nuances that are critical for electrical appliances. Unlike water and food, where quality often falls into a binary category(“good” or “bad”), the quality of electrical appliances is more of a spectrum as is the case in usability, energy efficiency and repairability. To enhance the clarity and effectiveness of quality marks for electric cooking appliances, several focused actions are required.

5.1.1.1. Enhancing the usefulness of quality marks

First, a revision of the national quality mark system is essential. This would involve developing a dedicated quality mark specifically for electric cooking appliances. This specialized mark should accurately capture the unique quality aspects of these appliances, encompassing the relevant technical parameters that define their performance and safety standards.

The quality mark verification process requires significant improvement. The existing short code system requires comprehensive testing to guarantee that consumers can access the correct information pertaining to quality marks. To further streamline this process, the adoption of technologies such as QR codes on product labels should be considered. This would enable consumers to easily access quality mark verification and detailed product information, facilitating informed purchasing decisions.

5.1.1.2. Energy efficiency labels

The development of dedicated energy efficiency labels for electric cookers is crucial. These labels should provide clear and concise information about the energy consumption of these appliances. To enhance their utility, incorporating the QR codes mentioned above into these labels could provide consumers with access to detailed information and comparisons, empowering them to make energy-conscious choices.

Lastly, establishing robust feedback and reporting mechanisms for consumers is imperative. These mechanisms should enable consumers to report any concerns regarding questionable quality marks or products. Effective follow-up on these reports and appropriate allocation of resources to address them are vital to maintain consumer trust and confidence in the quality assurance system.

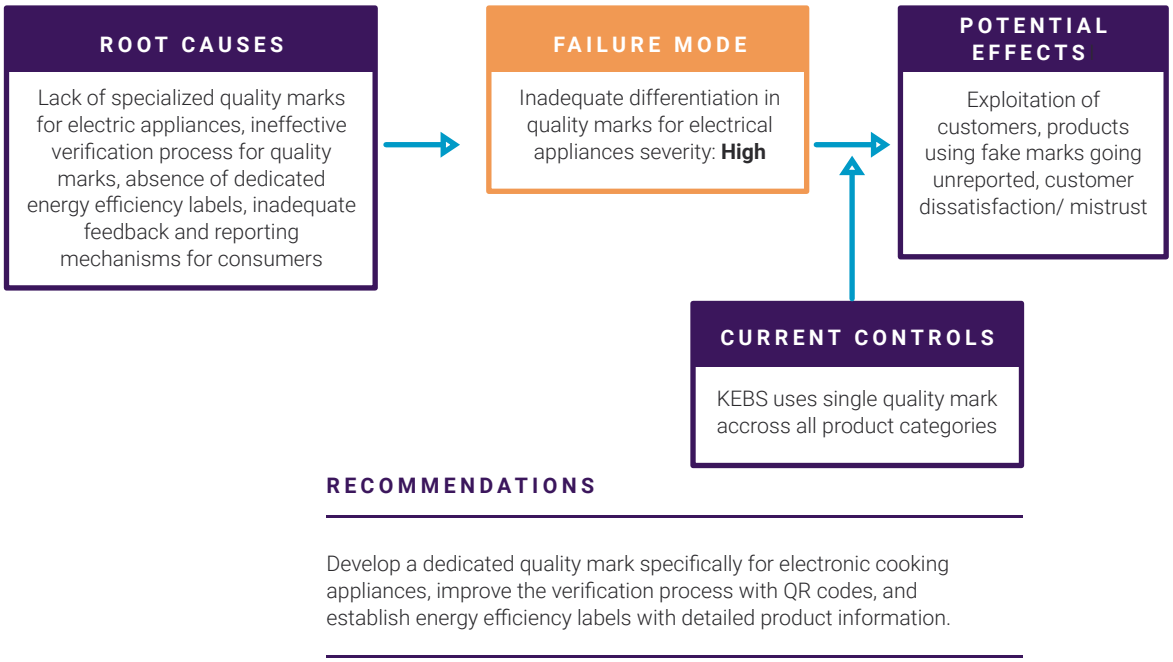


***Figure 5-1**: Summary - impact of efficient quality markers and consumer verification processes, current controls and recommendations*

5.1.2. Testing Laboratories

5.1.2.1. Develop local testing laboratories.

As highlighted in Section 4.2.2, there is a scarcity of testing laboratories equipped to evaluate electric cooking appliances, and local testing laboratories are often constrained by limited funding. To address this challenge, investment in modern testing equipment and development of rigorous market surveillance protocols to ensure compliance is required.

This includes the development and enhancement of the infrastructure of local testing laboratories specifically for electric cooking appliances, and support for accreditation. The Kenyan government, in collaboration with stakeholders, should invest in modern testing equipment and enhance existing laboratory infrastructure. This entails equipping laboratories with the necessary infrastructure and resources to conduct comprehensive evaluations of electric cooking appliances,

Furthermore, MECS should actively support the accreditation of local testing laboratories. By ensuring these laboratories meet rigorous international standards, consumer confidence in the quality and safety of tested appliances will be bolstered. Additionally, MECS should develop and implement robust market surveillance protocols

to monitor the quality and safety of electric cooking appliances in the market, taking swift action against non-compliant products.

5.1.2.2. Support training of laboratory staff

In tandem with these efforts, it is crucial to invest in the training of laboratory personnel. Financing training programs that equip laboratory staff with the necessary technical knowledge and practical skills will ensure accurate and reliable testing procedures. This, in turn, will contribute to the overall improvement of appliance quality and safety.

These enhanced testing facilities would ideally play a proactive role in market surveillance, with a particular emphasis on usability testing. By assessing the user experience and identifying potential areas for improvement, usability testing can contribute to the development of more user-friendly and efficient electric cooking appliances, thereby promoting their wider adoption.

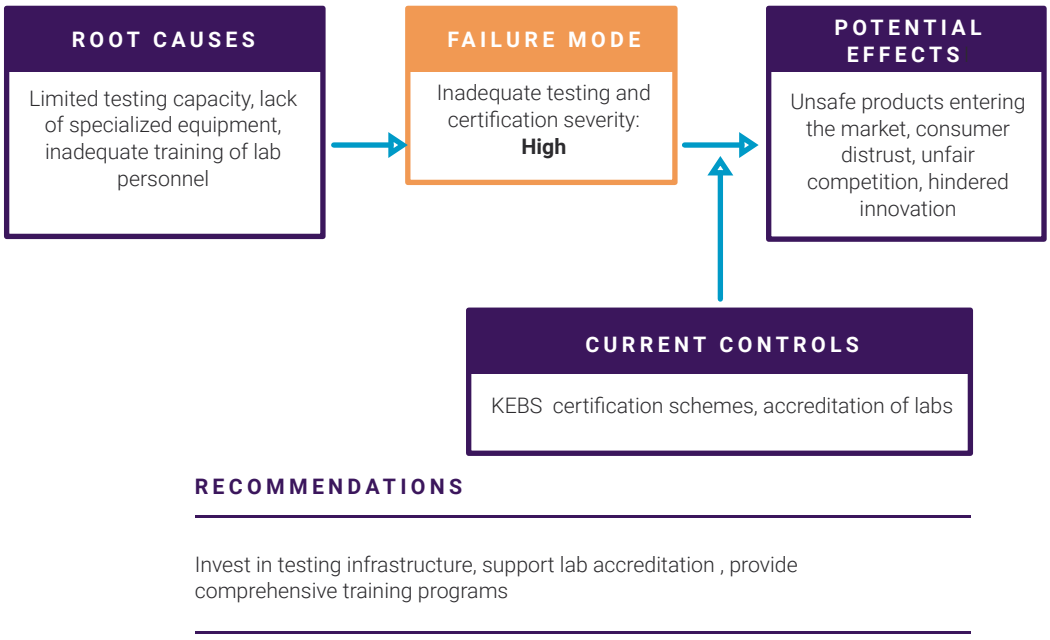


Figure 5-2: *Summary- impact of inadequate testing and certification, current controls and recommendations for improvement*

5.1.3. Consumer Education and Awareness

5.1.3.1. Encouraging purchase of good quality appliances

Social networks play a significant role in appliance purchasing decisions as detailed in Section 4.2.3. Social networks are the primary means of decision making, acting as a

quality verification system for users, thus consumer education can be used to inject information into the networks. To be effective, the program should target the harvest season since it is the optimal time for engaging a significant number of potential buyers. It should raise awareness regarding the existence and significance of quality marks, teach users how to verify these marks, explain the information they contain and highlight the benefits of using electric cooking appliances.

The campaign should seek to leverage the unique position of retailers (sellers) and technicians as key information delivery agents as described in Section 4.2.3, 4.3.2 and 4.3.3. Retailers and their staff should be trained on quality identification and provided with information on what to do where they identify poor quality products. Government administrative officers such as county commissioners and chiefs can also play a key role in reaching technicians operating in the counties and gathering them to facilitate their training by organisations with the relevant knowledge on quality marks.

A snowball method where technicians recommend each other would provide access to technicians operating informally who may be hesitant to be trained in formal settings for fear of being penalised by state agencies charged with enforcing licensing of technicians. Previous research also finds that technicians to be better position to help end users interpret technical information and play a key role in purchase decisions [24].

5.1.3.2. Recourse for poor quality purchases

Assisting consumers in seeking recourse for poor quality purchases requires a structured approach that emphasises both preventive measures (described above) and effective resolution pathways. Resolution requires that clear and accessible consumer complaint and redress channels be in place. Such channels should be well-publicised to ensure consumers are aware of where and how to seek redress. It is in the interest of manufacturers of good quality products to collaborate with consumer protection agencies to develop and implement a complaint resolution process. This is because the proliferation of poor-quality products could negatively impact their profitability or reduce consumer trust in new technologies.

To educate consumers, campaigns can be used to inform them about warranties and guarantees that come with electric cooking appliances, how to activate them, and the legal redress options available if they encounter substandard products. The benefits to

be gained from empowering consumers and provision of effective channels for redress include improved ecosystem accountability, higher standards of product quality and increased consumer satisfaction.

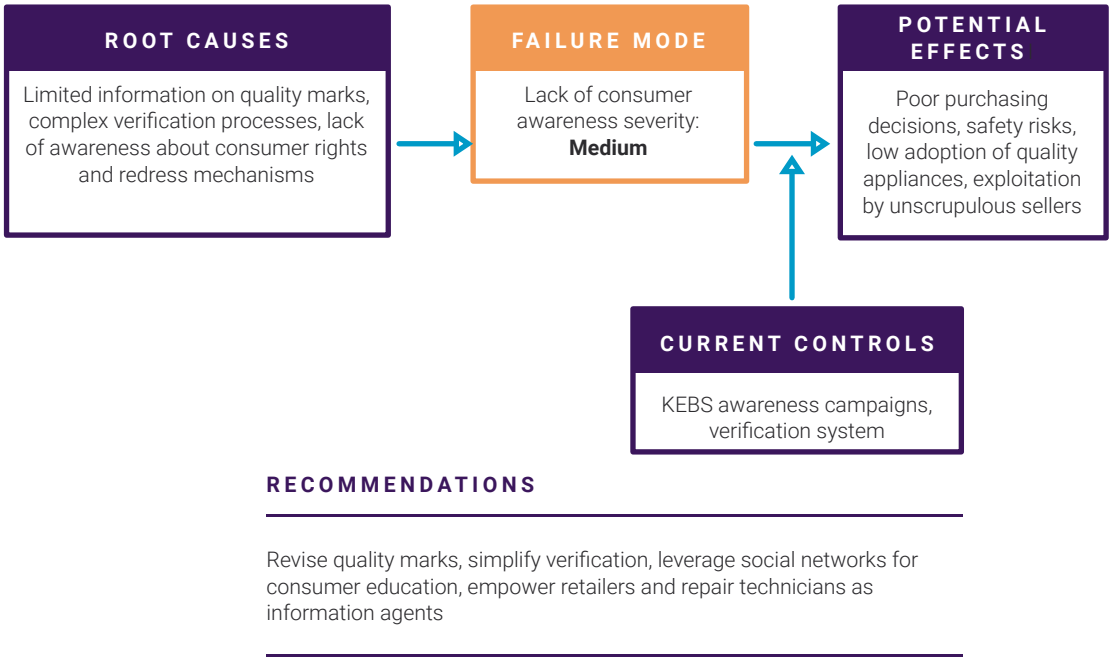


Figure 5-3: *Summary - impact of lack of consumer awareness and suggested controls and recommendations for improviement*

5.1.4. The Repair Ecosystem

5.1.4.1. Developing the repair ecosystem

As indicated in Section 4.2.3, most consumers utilise warranties obtained upon purchase of a product and subsequently seek the services of local technicians for repairs once the product warranty period expires. Therefore, to create an effective repair ecosystem, the initial step should involve identifying existing knowledge gaps among technicians, followed by the development of a comprehensive training curriculum. The curriculum should contain modules on customer service and safety standards so that technicians are skilled in client interaction and repairs, while maintaining a safe work environment.

Trainings should ideally be conducted in partnership with manufacturers. Each manufacturer should have the discretion to choose their preferred technicians within a specific region. These technicians would serve as the primary contact for products that are no longer under warranty, assessing whether they require manufacturer intervention

or can be repaired locally. Drawing inspiration from the UK's "repair café" model, technicians should be invited to participate and trained through community-based repair cafés. The cafés serve as an accessible, informal meeting place where, on a set date every month, individuals can take their malfunctioning or damaged electric cooking appliances for repair.

To further enhance this ecosystem, organizing regular training sessions and skill-sharing workshops at these cafés is crucial. These sessions, led by experienced technicians and experts, would cover essential repair skills, maintenance techniques, and troubleshooting for common appliance issues. For these sessions, partnerships with technical schools and vocational centres can provide a steady stream of trained volunteers and offer practical, hands-on training for students. These collaborations ensure a sustainable model for the repair cafés, where skills are continuously developed and passed on, making the repair ecosystem self-sustaining and an integral part of their community.

5.1.4.2. Effectiveness of the repair ecosystem

Most products found in rural communities are radios and TVs as shown in Section 4.2.3 and this is reflected in the failure numbers captured in Section 4.3.3. Therefore, expanding the scope of the repair café to encompass a broader range of electric appliances is a strategic move that would ensure its relevance to the community. By not limiting the services to electric cooking appliances alone, the café can attract a wider audience, catering to the diverse repair needs of the community, and encouraging use of the cafés.

This inclusive approach allows the repair café to become a one-stop hub for fixing a variety of household electric appliances, especially common ones like radios and TVs. Expanding the diversity in appliance types that can be repaired not only increases the number of customers for the repair cafés, but also enriches the skill set of the technicians working there, as they encounter a broader range of repair scenarios and technical challenges. To effectively manage this diversified repair ecosystem, it is crucial to appropriately structure café operations. The café can for instance organise dedicated days or sections for different types of appliances, to ensure that necessary tools and expertise are available to handle specific repair tasks.

Regular workshops and training sessions can be held to upskill any volunteers, covering a range of topics from basic electrical safety to advanced repair techniques for various appliances. Additionally, creating a system for pre-assessment of appliances can streamline the repair process, ensuring that each item brought in is directed to the right technician with the appropriate skills.

5.1.4.3. Integrating the e-waste ecosystem

The repair cafés can serve both as centres for mending various electric appliances and as collection points for e-waste. For manufacturers, this format can help enable compliance with EPR regulations discussed in Section 3.4.2.3 thus its mutually beneficial: manufacturers ensure compliance with EPR regulations while the repair cafés gain support and resources for their operations.

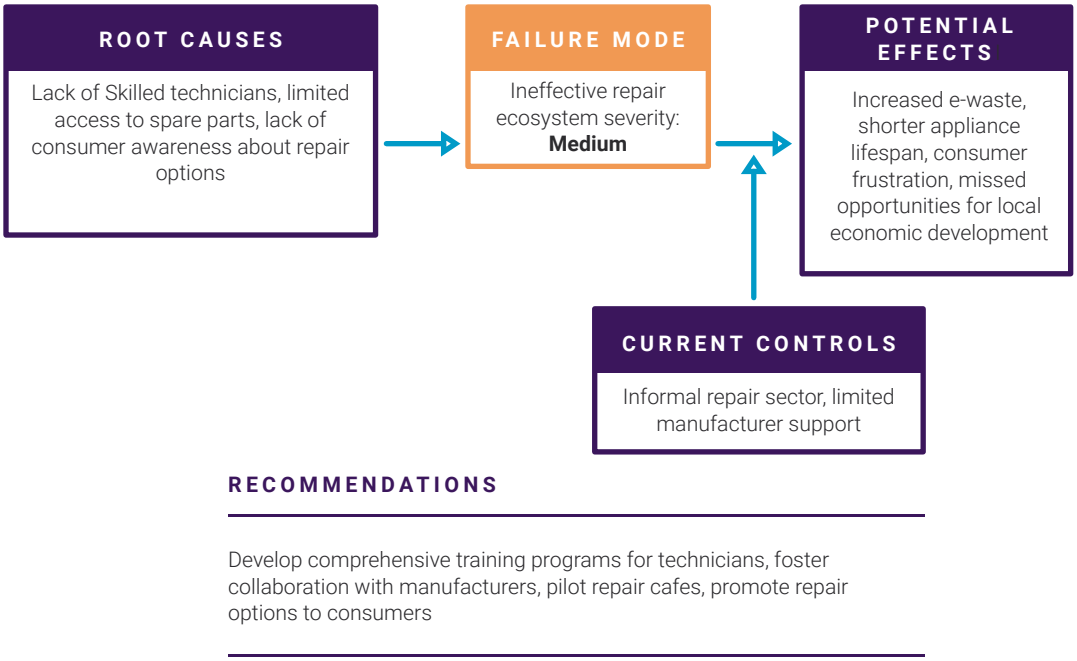


Figure 5-4: *Summary - impact of ineffective repair ecosystem the current controls and recommendations*

5.1.5. Legal and Policy Reforms

5.1.5.1. Enhancing enforcement mechanisms

There is a shortage of enforcement officers employed by the regulators as discussed in Section 4.1.2. However, given current austerity measures, the ability to expand the workforce and increase funding for regulators is constrained. A strategy that can be adopted to augment the capacities of regulatory agencies is partnerships with industry

stakeholders and consumer advocacy groups to encourage self-regulation. To improve its effectiveness consumers can be encouraged to report to trade associations, who would then address complaints to the members concerned. These trade associations would thereafter compile a report on the complaints received, information on how they were resolved and submit it to the regulatory authorities such as EPRA and ACA in Section 3.4.2.2.

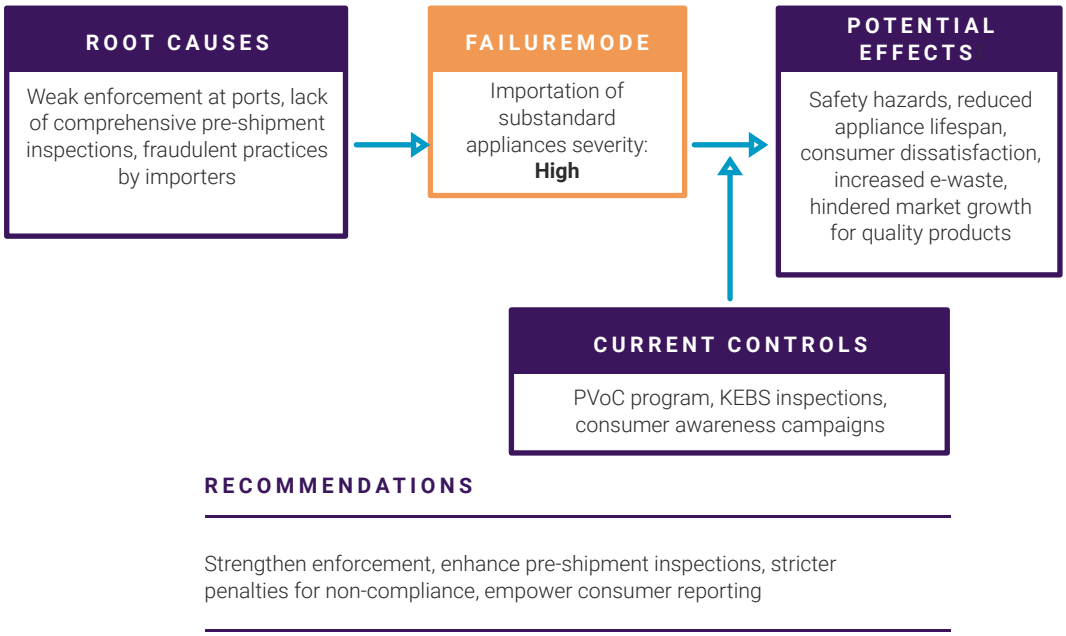


Figure 5-5: *Summary- impact of weak enforcement of standards at importation, the current controls and recommednations*

5.1.5.2. The need for better coordination

Improving coordination between government departments, especially when they fall under different ministries with varied priorities, is a challenging task. For quality of electric appliances, including electric cooking appliances, such coordination can be done under the auspices of the NQI. A committee can be formed with the objective of creating a unified approach to ensure effective operations of the electrotechnical quality ecosystem or a specific sector like the electric cooking ecosystem. This method would address overlaps and gaps and ensure a cohesive policy approach that aligns with the overarching goals of the NQI. Such a committee should include stakeholders from the private sector, consumer groups, and technical experts to ensure a broad-based and inclusive approach to policy formulation and implementation.

5.1.5.3. Strengthen consumer protection laws.

As per the reports in Section 4.3.1, consumer protection laws and regulations should be updated to provide a more robust legal framework for addressing quality issues in the ecosystem. This includes enhanced penalties and fines in the legal system for manufacturers and sellers who violate quality standards to act as a deterrent against poor quality products. Consumers should also be educated on their legal rights, remedies available in cases of appliance malfunctions or quality issues. For this to be effective, specialized training should be offered to judges and judicial officers on electric appliance related consumer protection. The process of providing this training may take some time, therefore the intervention of trade organizations which can establish their own systems to enable consumers seek recourse for poor quality products, should be encouraged.

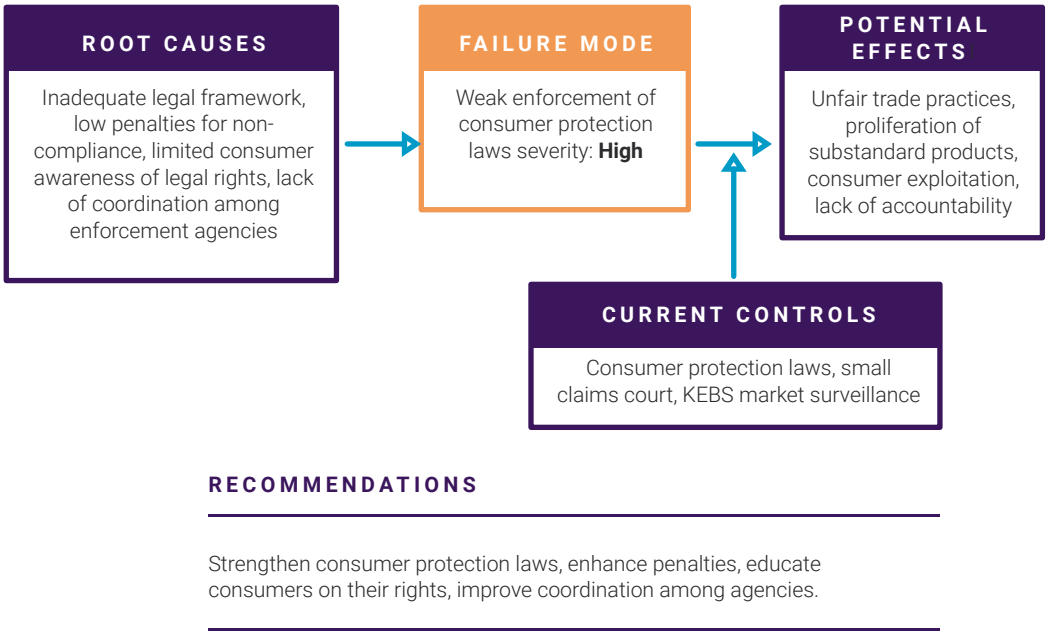


Figure 5-6: *Summary - impact of weak enforcement of consumer protection laws, current controls and recommendations*

5.1.6. Training and Capacity Building

5.1.6.1. Collaboration with manufacturers

Collaboration with manufacturers is pivotal for the effectiveness of all the initiatives outlined above, particularly in the realms of training and capacity building. Manufacturers possess in-depth knowledge of their products, making them invaluable

resources for developing accurate and practical training content. This collaboration can take the form of co-hosting workshops and seminars where manufacturers provide insights on appliance design, functionality, and common technical issues.

5.1.6.2. Government-endorsed certification programs

Government endorsement should be sought for training programs recommended in this document. The endorsement is useful as it can encourage wider participation and acceptance among stakeholders since it legitimizes training and capacity-building initiatives. This can be done through the integration of training modules into existing curricula of Technical and Vocational Education and Training (TVET) institutions, creating a more formal and structured pathway for skill development.

5.2. Future Research

The report has revealed several areas that require further investigation to enhance the understanding and effectiveness of the electric cooking appliance quality ecosystem in Kenya. These include:

5.2.1. The import process and Certificate of Compliance (CoC)

The study could not definitively determine if all exported products undergo testing and receive a CoC. Further investigation is needed to understand the discrepancies between importer claims and government assertions, and to ensure the CoC's reliability as a quality indicator.

5.2.2. The impact of electricity quality and wiring

The report acknowledges that poor electricity quality and substandard wiring can contribute to appliance failure. Further research should quantify the extent of these issues and their impact on appliance performance and consumer satisfaction. This would inform interventions to improve grid stability and promote safe wiring practices.

5.2.3. The role of the Small Claims Court

The report mentions the Small Claims Court as a potential avenue for consumer redress but notes a lack of data on its utilization for appliance-related disputes. Research could

explore the effectiveness of the Small Claims Court in addressing consumer complaints about appliance quality and identify any barriers to its use.

5.2.4. The dynamics of the informal repair sector

The report showed the importance of local repair technicians but notes their largely informal operation. Further research could explore the structure, practices, and challenges of this sector, informing strategies to support and formalize their operations, potentially through training and certification programs.

5.2.5. The impact of counterfeiting on the eCooking sector

While the report acknowledges the prevalence of counterfeits in the broader electrical and electronics market, specific data on the eCooking sector is limited. Research could assess the extent of counterfeiting in this sector and its impact on consumer safety, market confidence, and the adoption of genuine electric cooking appliances.

5.2.6. Consumer perceptions and preferences

The report provides insights into consumer behaviour and appliance usage patterns. However, further research could explore consumer perceptions of quality, brand preferences, and their purchasing decisions. This information would be valuable for manufacturers and marketers in developing products and campaigns that resonate with the target audience.

By addressing these research gaps, stakeholders can gain a more comprehensive understanding of the electric cooking appliance quality ecosystem in Kenya and develop targeted interventions to strengthen it, ultimately promoting the adoption of high-quality, safe, and efficient electric cooking solutions.

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Appendix A:
Household Survey

A. Household demographics and socio-economic indicators

- ☐ County:
- ☐ Subcounty:
- ☐ Does this household have a connection to the KPLC?
- ☐ When was it connected?
- ☐ Does the household own at least 2 working electrical appliances that they bought themselves?
- ☐ You are about to exit the survey. Confirm if the house does not own at least 2 different working electrical appliances that use KPLC.
- ☐ Does this household have an appliance that has failed in the past?
- ☐ How many?
- ☐ Was this household interviewed during the pre-screening survey?
- ☐ What is your name?
- ☐ Please enter the respondent phone number
- ☐ What is your age?
- ☐ What is your gender?
- ☐ What is your marital status?
- ☐ What is your mother tongue?
- ☐ What is the highest level of school that you have completed?
- ☐ Are you a renter, do you live with family, or do you own this house?
- ☐ How big is the land that this house sits on?
- ☐ What size of that land do you own?
- ☐ Occupation Details
- ☐ What is your occupation or work?
- ☐ What is the subcategory of the occupation?
- ☐ Where do you do this work? i.e. location at which they perform these activities
- ☐ Are you the head of the household?

- ☐ What is your relationship to the head of the household?
- ☐ Head of Household
- ☐ What is the head of the household's age?
- ☐ What is their mother tongue?
- ☐ What is the highest level of school that the head of the household has completed?
- ☐ What is the head of household's occupation or work?
- ☐ Where does the head of the household work? i.e. location at which they perform these activities
- ☐ Household Contacts
- ☐ Can you give me the primary phone number that we can contact you on, in the future?
- ☐ Whose phone number is this?
- ☐ What is the name of the phone owner?
- ☐ In case you're not available, which other phone number can we use?
- ☐ Whose phone number is this?
- ☐ What is the name of the phone owner?

B. Electric cooking and appliance ownership

- ☐ Owned Appliances and their Frequency of Use
- ☐ Do you currently own and use any electrical cooking appliances that use KPLC?
- ☐ Which electrical cooking appliances do you currently own and use?

  ~ *Note to enumerators: All appliances including gifted appliances*
- ☐ Which electrical cooking appliances that you currently own and use, did you buy yourself?

  ~ *Note to enumerators: Only self-bought appliances.*
- ☐ Do you currently own and use any other (non-cooking) electrical appliances that use KPLC?
- ☐ Which electrical (non-cooking) appliances do you currently own and use?

  ~ *Note to enumerators: All appliances including gifted appliances*
- ☐ Which electrical (non-cooking) appliances that you currently own and use, did you buy yourself?

~ *Note to enumerators: Only self-bought appliances.*

- ☐ Which is the most used electrical cooking appliance?

  ~ *Note to enumerators: Select 2 if more than 2. If 2 or less, select all*

- ☐ Which are your most used electrical (non-cooking) appliances?

  ~ *Note to enumerators: Select 3 if more than 3. If 3 or less, select all*

- ☐ Purchasing Decision
- ☐ When did you buy the appliance?
- ☐ What is the reason why you bought the appliance?
- ☐ How much did you buy the appliance for?
- ☐ How did you make the payments for the appliance?
- ☐ What is the name of the place where you bought the appliance?
- ☐ What is the type of location where you bought the appliance?
- ☐ What type of shop did you buy the appliance from?
- ☐ Are there any specific features of the appliance that you like?
- ☐ What features do you like and why do you like those features?
- ☐ Are there any specific features of the appliance that you dislike?
- ☐ What features do you dislike and why do you dislike those features?
- ☐ Are there additional features that you'd want to add to the appliance if you could?
- ☐ What features would you add and why would you add them?
- ☐ Consumer Awareness
- ☐ How did you decide to buy the appliance?
- ☐ Did you receive any information from the seller when purchasing the appliance?
- ☐ What information did you receive from the seller while purchasing?
- ☐ Has the information that the seller gave you helped you at any point while using the appliance?
- ☐ How did that information help you?
- ☐ Was any documentation provided to you when you bought the appliance?
- ☐ What documentation was provided?
- ☐ If someone has a warranty, how do they access/use it?
- ☐ How long was the warranty period?

  ~ *Note to enumerator: In months*

- ☐ While purchasing, did you check to see whether the appliance would work when you

got home?

- ☐ How did you check to see whether the appliance would work when you got home?
- ☐ At any point, did you receive any information on the appliance from anyone else?

  ~ Note for enumerator: This includes before, during and after purchase
- ☐ Who provided you with that information?
- ☐ What information was it?
- ☐ Has that information helped you at any point while using the appliance?
- ☐ How did that information help you?
- ☐ Given a scale of 1 to 4 where 1 is a bad experience and 4 is the best experience, how would you rate your experience using the appliance?
- ☐ Explain this rating
- ☐ Based on your experience with the appliance, is there any information that you didn't receive at purchase time but now think should have been provided?
- ☐ What information do you think should have been provided and why?

C. Product failure and repairs

- ☐ Since you were connected to KPLC, has any of your electric appliances ever failed or spoilt?
- ☐ Which appliances are those?
- ☐ Were any of those appliances repaired and are working to date?

  ~ Example for enumerator: Appliance (e.g. radio) failed, was taken for repair (no of times repaired is not an issue), and is now working
- ☐ Which appliances were repaired and are working to date?

  ~ Note for enumerator: Prioritize electric cooking appliances. Select a maximum of 3.
- ☐ Were any of those appliances repaired but are not working now?

  ~ Example for enumerator: Appliance (e.g. radio) failed, was taken for repair (no of times repaired is not an issue), but is no longer working
- ☐ Which appliances were repaired but are not working now?

  ~ Note for enumerator: Prioritize electric cooking appliances. Select a maximum of 3.
- ☐ Were any of those appliances not repaired at all?

  ~ Example for enumerator: Appliance (e.g. radio) failed, was never taken for repair (not even once)

- ☐ Which appliances were not repaired at all?

  ~ Note for enumerator: Prioritize electric cooking appliances. Select a maximum of 3.
- ☐ Purchase Information of Failed Appliance
- ☐ When did you buy the appliance?
- ☐ What is the name of the place where you bought the appliance?
- ☐ How would you describe the place you bought the appliance?
- ☐ What type of shop did you buy the appliance from?
- ☐ Did you receive any information from the seller when purchasing the appliance?
- ☐ What information did you receive from the seller while purchasing?
- ☐ Has the information that the seller gave you helped you at any point while using the appliance?
- ☐ How did that information help you?
- ☐ Was any documentation provided to you when you bought the appliance?
- ☐ What documentation was provided?
- ☐ If someone has a warranty, how do they access/use it?
- ☐ How long was the warranty period in months?
- ☐ While purchasing, did you check to see whether the appliance would work when you got home?
- ☐ How did you check to see whether the appliance would work when you got home?
- ☐ At any point, did you receive any information on the appliance from anyone else? This includes before, during and after purchase
- ☐ Who provided you with that information?
- ☐ What information was it?
- ☐ Has that information helped you at any point while using the appliance?
- ☐ How did that information help you?
- ☐ Fixed Appliances
- ☐ How many times has the appliance failed?
- ☐ When was the first time the appliance failed?
- ☐ When was the first time the appliance was repaired?
- ☐ Did you contact the place you bought the appliance before repairing?
- ☐ What did they say when you contacted them?
- ☐ Why did you not contact the place you bought?

- [ ] When was the last time the appliance failed?
- [ ] Who fixed the appliance?
- [ ] Are you trained to fix electrical appliances?
- [ ] Where were you trained?
- [ ] What was the problem with the appliance?
- [ ] How much did it cost to repair the appliance?
- [ ] Did the person who fixed the appliance tell you what the problem was?
- [ ] What was the problem with the appliance?
- [ ] How much did the repair person charge to repair the appliance?
- [ ] Repair Person Profile
- [ ] How do you know the repair person?
- [ ] On a scale of 1 to 4: 1 being not confident with their repair skills, and 4 being confident with their repair skills - How would you rate the person's repair skills?
- [ ] Explain your rating
- [ ] What is the qualification of that repair person?
- [ ] How did you ascertain that they have that qualification?
- [ ] What else does the repair person do for the community?
- [ ] What is the name or nickname of the repair person? Can you give us their phone number?
- [ ] Where did you take the appliance after it failed the last time?
- [ ] Failed Appliances
- [ ] When did the appliance fail?
- [ ] What do you think caused the failure of the appliance?
- [ ] Did you contact the place you bought the appliance?
- [ ] What did the place you bought the appliance say when you contacted them?
- [ ] Why did you not contact the place you bought the appliance?
- [ ] Do you know a repair person who can fix the appliance?
- [ ] Why have you decided not to take the appliance for repair by that repair person?
- [ ] Do you still have the appliance?
- [ ] Where have you kept the appliance?
- [ ] Appliance Ownership
- [ ] Are there any cooking appliances that you would like to own if you had the means?

- ☐ Which cooking appliances would you like to own if you had the means? I'd like the one most important for you
- ☐ Are there any (non-cooking) electrical appliances that you would like to own if you had the means?
- ☐ Which (non-cooking) appliances would you like to own if you had the means? I'd like the two most important for you
- ☐ Where did you hear about the appliance?
- ☐ Why would you like to own the appliance?
- ☐ What is stopping you from owning the appliance?
- ☐ How would you prefer to pay for the appliance if you were to get it?
- ☐ Why do you prefer this method of payment?
- ☐ I'd now like to ask some more questions about the appliances you would like to buy in future if you have the means
- ☐ Whose opinion would you seek before buying the appliance?
- ☐ Why would you seek that person's opinion?
- ☐ Where would you go to buy the appliance from?
- ☐ Please explain why you would go there to buy the appliance
- ☐ At the point of purchase would you check to see if the appliance will work when you get home?
- ☐ How would you check to see if the appliance will work when you get home?
- ☐ Would you ask the seller of the appliance for any documentation?
- ☐ Which documentation would you ask to be given by the seller of the appliance?
- ☐ Let's say you have now bought all the preferred appliances that you listed and got 1 year warranty.
- ☐ What would you do if the appliance stopped working 1 day after purchase?
- ☐ What would you do if the appliance stopped working 3 weeks after purchase?
- ☐ What would you do if the appliance stopped working 6 months after purchase?
- ☐ What would you do if the appliance stopped working 1.5 years after purchase?
- ☐ Of the choices, what would do warranty cover?

  ~ Note to enumerator: Read out the choices and select the one they say warranty covers.
- ☐ Explain your selections

D. Awareness of quality marks

- ☐ Which type of organization is most capable of ensuring that the appliances you buy are of good quality?
- ☐ Whose job is it to ensure that Kenyans can buy high quality appliances?
- ☐ Whose job is it to protect appliance buyers like you from fraudulent companies?
- ☐ Do you know the name of the government agency that is supposed to make sure that appliances sold to you are good quality?
- ☐ What is the name of that agency?
- ☐ How would you tell if an appliance has been approved by that agency?
- ☐ Do you check for approval by the agency when buying?
- ☐ Explain how you check for approval
- ☐ Explain why you don't check for approval


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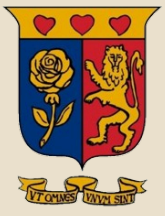

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