REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT.

STATE DEPARTMENT FOR LIVESTOCK DEVELOPMENT

KENYA NATIONAL LIVESTOCK RESEARCH AGENDA

2025-2035

FOREWORD

Kenya's livestock sub-sector contributes 42% of the agricultural GDP, and 12% to the national GDP while accounting for ~30% of total agricultural products. Thus, fundamental to Kenya's economy, through its contribution to economic growth, poverty reduction, job creation, household incomes, sustainable livelihoods, and food and nutrition security. The sub-sector encompasses farmed animals (meat, dairy, skin, fur, wool, and egg production), emerging livestock, as well as apiculture (beekeeping) and aquacultures (fish and other seafood).

The importance of livestock is set to rise further, as growing incomes, and the projected doubling of Kenya's population by 2050, leads to higher demand for livestock and livestock products. Consumer preferences are also changing; hence increasing demand for new livestock products and higher food safety standards, whilst environmental concerns are leading consumers to avoid harmful chemicals and unsustainable production practices. The livestock sub-sector has major opportunities to contribute to a more sustainable, climate-smart, and competitive Kenya and ensure responsible livestock production in a changing global world. Growth in the livestock sector has the potential to help Kenya achieve its SDG goals. The livestock sub-sector must therefore be enhanced by embracing new technologies to upscale farming for quality production if Kenya is to compete in the global market.

Research and innovation will make Kenya's livestock sector competitive, balanced, and efficient. Support for research and innovation in the livestock sub-sector will be necessary if the challenges of ensuring the supply of safe and healthy high-quality food, reducing environmental impact, making better use of resources, enhancing animal welfare, meeting the needs of consumers and contributing to a viable economy in ways that are appreciated by society, are to be met. In doing so, it's critical to recognize that time and resources are limited, and therefore it is essential to prioritize and focus on the areas that offer the greatest opportunity for impact.

The purpose of this National Livestock Research Agenda is to outline the livestock research and innovation areas that will enhance the realization of Kenya's Vision 2030 and the scientific priorities anchored on the SDGs and the African Union Agenda 2063. Ultimately, the aim is to direct resources toward discovering, developing, and delivering game-changing interventions in priority areas that will help achieve the greatest return on investment

These ideas have not only been developed after consultation with the relevant stakeholders but have also been inspired by the Livestock Policy Sessional Paper Number 3 of 2020 as well as Kenya's Agricultural Sector Transformation and Growth Strategy 2019-2029.

My Ministry will continue to provide a supportive environment for research and innovation in the livestock industry so that the livestock sub-sector can play a central role in contributing to a smart, sustainable, and competitive Kenya.

Sen. Mutahi Kagwe, EGH.
Cabinet Secretary,
Ministry of Agriculture and Livestock Development

PREFACE

The Livestock Sector plays a predominant role in the agricultural sector by contributing to the food andnutrition security of Kenya. Similarly, its share in economic development, particularly in the rural economy, is substantial. Over the last decade, the livestock sector has significantly expanded generating employment and economic gains at households and national levels.

Rapidly increasing demand for animal-source foods, fueled by the combination of income growth, population increase, and urbanization, exerts pressure on the livestock sector, which needs to adapt fast to meet this demand. Livestock research can facilitate sustainable livestock development to serve the needs of both producers and consumers and enhance the sector's contribution to the economy in general.

This Livestock Research Agenda has been developed to address gaps in the livestock sector, recognizing the integral and complementary role that livestock plays in sustainable development. The agenda stipulates the benefits already realized from past investments in livestock research and makes the case for future approaches in livestock research.

It considers that the resources available for research are limited, and hence the need for prioritization of potential livestock researchable issues; guided by the expected benefits and costs.

The document articulates the background, rationale, focus, and scope of the research, overall objectives and sub-themes in the following thematic areas: (1) Genetic resources, Breeds and Breeding Technologies, (2) Feeds and Feeding Systems, (3) Animal Health, Husbandry, and Welfare, (4) Value addition and Marketing, (5) Socio-economic issues (6) Food Safety (7) Cross-cutting issues (8) Companion Animals and Animals used in Research, and (9) Livestock Resource Information Management.

Adherence to the recommendations of this strategic document will ensure that the limited financial resources are utilized in a more focused and effective manner. The development of the National Livestock Research Agenda 2025-2035 was highly consultative and interactive with views of key stakeholders from the private sector, research organizations, farmers, and producer associations, informing the process. The Ministry of Agriculture & Livestock has benefited immensely from the expertise of individuals, groups and organizations who I wish to thank for their invaluable input. My special thanks also goes to the technical team that developed the NLRA document.

Hon. Jonathan Mueke, CBS
Principal Secretary,
State Department for Livestock Development

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ACRONYMS

ADC	Agricultural Development Cooperation
AMR	Anti-microbial Resistance
APVC	Agricultural Product Value Chain
ASALs	Arid and Semi-Arid Areas
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central
BSF	Black soldier fly
CAADP	Comprehensive Africa Agriculture Development Programme
CBO	Community-Based Organization
CO_2	Carbon Dioxide Gas
CRAC	Centre Research Advisory Committee
DLP	Directorate of Livestock Production
DNA	Deoxyribonucleic acid
DRSK	Dairy Recording Service of Kenya
DRSRS	Department of Resource Surveys and Remote Sensing
DVS	Directorate of Veterinary Services
FAO	Food and Agriculture Organization of the United Nations
FARA	Forum for Agricultural Research in Africa
FBO	Faith-Based Organizations
GHG	Green House Gases
IARCs	International Agricultural Research Centers
ICIPE	International Centre for Insect Physiology and Ecology
ILRI	International Livestock Research Institute
IPR	Institute of Primate Research
IRR	Internal Rate of Return
ISO	International Organization for Standardization
KAGRC	Kenya Animal Genetic Resource Centre
KALRO	Kenya Agricultural Livestock Research Organization
KDB	Kenya Dairy Board
KENIA	Kenya National Innovation Agency
KEPHIS	Kenya Plant Health Inspectorate Service
KMD	Kenya Meteorological Department
KSB	Kenya Stud Book
KWS	Kenya Wildlife Services
MAS	Marker Assisted Selection
MOET	Multiple Ovulation and Embryo Transfer
MOU	Memorandum of Understanding
MRL	Maximum Residue Levels
NACOSTI	National Commission for Science, Technology and Innovation
NARS	National Agricultural Research System

NBA	National Biosafety Authority
NEMA	National Environmental Management Authority
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NLRA	National Livestock Research Agenda
NMK	National Museums of Kenya
NPV	Net Present Value
NRF	National Research Fund
NRM	Natural Resource Management
OIE	World Organization for Animal Health
PCPB	Pest Control Products Board
PME	Project Monitoring and Evaluation
RUFORUM	Regional University Forum for Capacity Building in Agriculture
SDGs	Sustainable Development Goals
ST &I	Science, Technology, and Innovation
TIMPs	Technologies, Innovations, and Management Practices
VMD	Veterinary Medicines Directorate
WHO	World Health Organization
WTO	World Trade Organization

DEFINITION OF TERMS

Antimicrobial Resistance (AMR) – The resistance of pathogens to antibiotics and other antimicrobial agents due to overuse or misuse, posing risks to animal and human health.

Arid and Semi-Arid Lands (ASALs) – Dryland regions in Kenya where livestock farming is a key livelihood source but faces challenges such as drought and limited feed availability. Climate Resilient Farming approaches that integrate sustainable land management, water conservation, and climate-smart practices to ensure long-term agricultural productivity in the face of climate change.

Climate-Smart Agriculture (CSA) – Agricultural practices that enhance productivity, resilience to climate change, and reduce greenhouse gas emissions.

Drought-Tolerant Forages – Forage species, such as Brachiaria grass and fodder trees, that can withstand dry conditions and provide sustainable feed resources.

Emerging Livestock Diseases – New or re-emerging diseases affecting livestock, often linked to climate change, globalization, or intensified farming.

Food and Nutrition Security – Ensuring adequate availability, access, and utilization of livestock products to meet dietary needs and improve human health.

Indigenous Breeds – Locally adapted livestock species that possess traits such as disease resistance, drought tolerance, and the ability to thrive in harsh environments.

One Health Approach – A multidisciplinary strategy integrating human, animal, and environmental health to prevent and manage zoonotic diseases and antimicrobial resistance.

Probiotics– Beneficial microorganisms added to animal feed to enhance gut health, improve digestion, and boost immune responses.

Rangeland Management – Sustainable practices for maintaining and restoring grazing lands to support livestock production and biodiversity conservation.

Sustainable Livestock Production – Environmentally friendly and economically viable animal farming systems that ensure long-term productivity and resilience.

Value Addition in Livestock Products – Processing and enhancing livestock products to improve quality, shelf life, and marketability.

Zoonotic Diseases – Diseases that can be transmitted between animals and humans.

EXECUTIVE SUMMARY

Livestock in Kenya is central to addressing the challenges of feeding a growing human population, creating wealth, reducing poverty, and managing the degradation of natural resources. Despite the vast potential, number, and diversity of the livestock population, the Kenyan livestock sub-sector faces chronic challenges, including a high prevalence of endemic diseases, poor quality feeds and nutrition, and high stocking rates on grazing lands in ASALs. Additionally, the lack of support services, such as extension and veterinary services, impedes farmers' education and knowledge while hindering the adoption of emerging and sustainable approaches, and regional potential. Kenya also suffers from inadequate data and information management, which leads to poor planning and prioritization for improved services. This includes insufficient mapping and inventory of breeds, poor marketing for livestock and livestock products, and inadequate technical, human, and livestock-associated infrastructure and capacity. The lack or under-utilization of appropriate emerging technologies has resulted in limited upscaling for smallholder farmers and has led to the production of livestock and associated products in low quantities and of poor quality, causing their products to be neglected by both domestic and international markets.

In the past decade, technological and socio-economic factors affecting livestock research have changed significantly. During the same time, livestock development has increasingly focused on diversifying, value addition, improving product quality, food safety, promoting equity in economic growth, capturing and creating new markets, and addressing gender parity, all of which are anchored in research.

In Kenya, livestock research is conducted by public and private sector institutions, but there is a lack of a common vision, legal, and strategic framework. This situation has resulted in a lack of cohesion, inefficient resource use, and limited impact. Furthermore, the current shift in global livestock research toward integrated livestock research for development and a demand-driven research approach calls for substantial adjustments in how research is organized and managed.

Livestock will effectively contribute to national goals if concerted efforts are made to address the identified constraints. Additionally, establishing a national livestock research agenda that captures the complementarities of diverse actors, emerging themes in livestock research and development, will contribute towards addressing these shortcomings.

To adapt to changing processes, the National Livestock Research Agenda must be dynamic, innovative, responsive, and well-coordinated, guided by a common vision, mission, and goals, and structured within a programmatic framework. It must be synchronized with the transformations occurring in livestock education, training, extension, and other scientific and development fields.

It is against this background that the Government of Kenya has developed the National Livestock Research Agenda 2025 - 2035. The broad objective of the agenda is to ensure that livestock research in Kenya can address current and emerging challenges through the development and application of appropriate technologies, innovations, and management practices.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

The Livestock Sector plays an important role in Kenya's economy contributing approximately 12% of the Gross Domestic Product (Livestock Policy, 2020; IGAD, 2011). The Sector supplies the domestic requirements of meat, milk, dairy products, eggs, and other livestock products while accounting for over 30% of the total marketed agricultural products and providing approximately half of Kenya's Agricultural Sector labour force. In addition, the Sector earns the country substantial foreign exchange through the export of livestock and livestock products. The Sector also contributes substantial earnings to households through the sale of livestock and livestock products and provides raw materials for agro-based industries. Thus, it is one of the key sectors expected to deliver the 10% annual economic growth rate envisaged under the Economic pillar of Vision 2030.

The National Population and Housing Census of 2019 showed that Kenya's animal resource base comprised 2.2 million dairy cattle, 559,000 dairy beef, 13 million indigenous cattle, 19.3 million sheep, and 28 million goats. In addition, the country was shown to have 4.6 million camels, 1.2 million donkeys, and 792,906 pigs (DLP, 2022), 30.3 million indigenous chickens, 5.6 million layers, 2.9 million broilers, 561,000 rabbits and 1.2 million beehives - signifying a diversified animal resource-base. As the standards of living in the country improve, demand for animal products will increase. Mixed farming, the basis of Kenya's agriculture, is dependent upon productive livestock and contributes to sustainable land use while allowing for the dual use of limited space - a key cog in transforming agriculture. Realization of food and nutrition security as envisaged in the Government's key policies calls for increased sustainable livestock production.

Presently, the major constraints besetting Kenya's livestock industry include diseases, malnutrition, mismanagement, and low inherent productivity. The present production level is estimated to be one-third of that which should be obtained from existing stock - basically, the country is losing 70% of the realized potential of the livestock sector Other constraints include increasing human population leading to pressure on agricultural land and negative ecological outcomes; unsustainable land and environment management practices; dependency on unreliable rain-fed agriculture; inaccessible and high input costs; climate change resulting in severe, erratic weather patterns, and emerging pests and diseases; and, decreasing access to production resources such as, credit and technology amidst increasing poverty levels.

To increase livestock productivity, research must include improvements in breeding and husbandry. Further, the adoption of emerging livestock technologies and innovations can lead to increased productivity and quality along livestock value chains. However, livestock research is constrained by, among others, inadequate prioritization of researchable areas, which leads to lack of complementarity between livestock research institutions and programmes, duplication of livestock research efforts and weak interdisciplinary collaborations and partnerships in livestock research.

The complex nature of livestock research including the process and long cycle duration makes it expensive and complicated by funding priorities. The funding challenge is further complicated by the increased dependence on partners and external funding agencies leading to a skewed research agenda not aligned with national priorities for livestock sector development. Therefore, the

government needs to upscale funding, set priorities, and ensure parties, both external and local, develop complementary agendas, guided by national priorities. This will ensure that the research does not only address the technical production problems (feeding, breeding, health, and husbandry) but also includes and strengthens the component of key socio-economic aspects such as gender, culture, and indigenous technical knowledge that equally affect the livestock Sector. The strengthening of this sector also requires leveraging biotechnology and other technologies encompassing breeding, Geographic Information Systems, remote sensing, Artificial Intelligence, IoT, and Big Data analytics for livestock research. The inadequate funding of research at the national level cascades to poor funding considerations for priorities within the livestock sector, slowing down the production of innovative findings and adaptive research in livestock.

The National Agricultural Research System (NARS) Policy (2012) lays the ground for a well-coordinated livestock research agenda. However, this has had challenges over the years with limited results. Currently, most livestock-related research and technological development in the country is being supported by the national government and development partners. The key challenges include low budgetary considerations by the government. The contribution of the development partners though of significant proportion is largely inadequate to address the national livestock research needs. The inclusion of the livestock research agenda within the overall agricultural research funding considerations relegates the importance and focus of funding for livestock sector research. Under this arrangement, the crop agriculture component is given greater consideration in all administrative matters including allocation of funding for research thus slowing down the development and implementation of appropriate livestock research agenda. Dissemination of research findings among Livestock Sector stakeholders is also limited. This is further complicated by the limited translational and dissemination of livestock-related scientific findings and their adoption in addition, key socio-economic factors that influence livestock production have not been given sufficient attention in research.

The National Livestock Research Agenda (NLRA) is designed to serve as a guide for planning, prioritizing, and allocating funding for livestock research programmes. It is expected to meet the current needs of the sector, and address emerging constraints, such as unpredictable climatic change and variability and the ever-escalating demands for livestock products, due to increased human population. This agenda covers the period from 2022 to 2030.

The overarching objective of this research agenda is to address the above constraints that plague Kenya's livestock industry to enhance food and nutrition security, increase livestock raw materials' yields, and encourage innovative value addition, creation of employment and enhanced household revenues.

The overall research agenda are anchored on enhancing livestock breeding and reproduction; improving feed, feeding and nutrition systems; livestock health and hygiene, safety and quality of livestock products; food safety; livestock production systems, economics and marketing; livestock waste, environment and society; and livestock welfare.

1.2 RATIONALE

Considering the challenges and constraints faced by the livestock sector in Kenya, and the need to generate data, develop new approaches and technologies, and enhance their adoption and utilization, the National Livestock Research Agenda is a necessary anchor and guide. As aforementioned, most livestock sector research initiatives are undertaken without adequate planning and priority-setting systems for public-private interaction, and industry linkage. This has partly been caused by poorly coordinated livestock research planning, which often leads to, among others, duplication of efforts, moribund research, and an unaligned research agenda to the national priorities. Thus, the need for a structured, and prioritized national livestock research agenda. This agenda should also address the projected increased demand for livestock and associated products; the threat of emerging and re-emerging diseases; climate change, and the need for innovations in different production systems; value chain insufficiencies, and technological insufficiencies. Thus, this research agenda provides a structured framework to address these challenges and drive innovation, sustainability, and economic growth in the livestock sector.

1.3 SCOPE

The Kenya Livestock Research Agenda (LRA) encompasses all facets of the livestock sector to enhance its contribution to food security, economic growth, and environmental sustainability. This includes research spanning all livestock value chains (beef, dairy, poultry, sheep, goat, rabbit, pig, camel, apiculture, non-conventional, and emerging livestock from primary production to processing and marketing. The scope extends to sustainable resource management, including rangelands, water, and feed resources, as well as addressing the impact of climate change and promoting climate-smart livestock production practices. Further, the NLRA recognizes the importance of animal health and welfare, food safety, and market access, emphasizing compliance with international standards. Additionally, the scope includes ethical considerations for animals used for research and the contributions of companion animals to livelihoods and well-being.

1.4 OBJECTIVES

1.4.1 Overall objective

To ensure that research in livestock, animals in research, and companion animals in Kenya can address the current and emerging challenges through the development and application of appropriate technology, innovations, and management practices.

1.4.2 Specific Objectives

- **Enhance Animal Genetic Resources Development.**
- **Optimize Feeds and Feeding Systems**
- **Improve Animal Health, Husbandry and Welfare**
- **Enhance Value Addition and Market Competitiveness**
- **Establish an Integrated Platform for Data and Information Management**
- **Address Socio-Economic and Cultural Dimensions of Livestock Production**
- **Strengthen Food Safety and Consumer Protection**
- **To establish a collaborative livestock Resource Information Management Platform that provides data and analytics for stakeholders, enabling actionable insights and evidence-based decisions.**
- **Enhance Research on Companion Animals and Animals Used in Research**
- **Address Cross-Cutting Issues Affecting Livestock Research and Development**

1.5 VISION, MISSION, AND CORE VALUES

Although the National Livestock Research Agenda targets the Livestock Sector, it is anchored on the Vision, Mission, and Core Values of the Ministry of Agriculture, Livestock Development.

1.5.1 Vision

A food-secure and wealthy Nation anchored by an innovative, commercially oriented, and competitive agricultural sector

1.5.2 Mission

To improve the livelihood of Kenyans and ensure food and nutrition security through the creation of an enabling environment and ensuring sustainable natural resource management

1.5.3 Core Values

To complement the Vision and Mission and build its own culture, the State Department for Livestock has identified the following core values:

i. **Professionalism**: Apply the highest standards of service delivery.
ii. **Integrity**: Uphold honesty, uprightness, and reliability always.
iii. **Transparency and accountability**: Be open and answerable to the various stakeholders.
iv. **Partnership**: Efforts shall be made to deliver as one through enhanced collaboration/ learning and sharing.
v. **Equity**: Ensure impartial and equitable representation of all forms of diversity within our processes.
vi. **Efficiency and Responsiveness**: To be responsive and exceed customer expectations in provision of services.

CHAPTER 2: SITUATIONAL ANALYSIS

2.1 KEY CHALLENGES AND OPPORTUNITIES IN LIVESTOCK VALUE CHAINS

2.1.1 Challenges

i. Inadequate and inconsistent/uncertain investment and funding for livestock research.
ii. Inadequate livestock research facilities and infrastructure.
iii. Conflict and overlaps in institutional mandates.
iv. Poor coordination and regulation of livestock research.
v. Inadequate and ineffective collaboration and partnership among institutions undertaking and supporting livestock research.
vi. Uncoordinated livestock research priority setting.
vii. Weak linkage between research priority setting; and research program planning.
viii. Weak linkage and collaboration between farmers, extension, and researchers.
ix. Poor and inadequate sharing and dissemination of livestock knowledge.
x. Inadequate tracking of performance in livestock research programs.
xi. Low adoption, upscaling, and commercialization of livestock technologies and innovations.
xii. Inadequate human resources to manage and support livestock research.
xiii. Limited private sector participation in research.

2.1.2 Opportunities

i. Sessional Paper No. 3 of 2020 on The Livestock Policy and other related policies and strategies that promote the need to address livestock issues are already in place.
ii. The National Research Fund and other funding agencies that support livestock research exist.
iii. Presence of national, regional and international institutions, agencies, and networks willing to fund and collaborate in livestock research.
iv. Political good-will for strengthening research and development exists; and
v. Kenya has ratified international conventions related to livestock research.

2.2 LIVESTOCK VALUE CHAINS

Various livestock value chains operate across diverse production systems, including intensive, semi-intensive, and pastoral systems. Bottom-Up Economic Transformation Agenda (BETA) focuses on improving agricultural production and productivity, value addition and marketing, and prioritizing select livestock value chains namely, dairy, beef, and leather development. Special emphasis will be given to the priority value chains identified under all the relevant policies governing the livestock sector. This section outlines key livestock value chains and background on research issues. Research in livestock value chains is critical to addressing productivity challenges, disease threats, climate resilience, and market competitiveness. Strengthening research within specific value chains will enhance food security, livelihoods, and economic growth in Kenya's livestock sector.

2.2.1 Dairy

Common dairy-producing animals include cattle, goats, sheep, and camels, among others. Research on dairy in Kenya focuses on improving productivity and sustainability. The Kenya Agricultural and Livestock Research Organization (KALRO) plays a key role through its Dairy Research Institute, which focuses on areas like genetic improvement, feed and nutrition, disease management, and value addition. Despite these efforts, the dairy industry faces hurdles such as low milk yields, high production costs, and limited adoption of modern technologies. The research in this area during the period will mainly focus on genetic improvement to achieve resilience and high production, feed and nutrition, disease prevention, and value addition among others.

2.2.2 Red meat

The red meat sector is a significant contributor to Kenya's economy, supporting millions of households involved in the production of beef, goat meat, mutton (sheep meat), camel meat, pork (pig meat), and to a lesser extent, game meat sources such as ostrich and wild game ranching, predominantly under pastoralist and smallholder systems. While beef constitutes a substantial portion of the red meat consumed, goat meat and mutton are also vital components of local diets and cultural practices, particularly in arid and semi-arid regions. Camel and ostrich meat are also gaining importance in specific areas. Current production faces challenges, including varying growth rates of indigenous cattle, goats, sheep, camels, and ostriches depending on breed and production system, and limited value addition for all red meat sources. Feed costs are a major constraint, exacerbated by national feed deficits and high post-harvest losses. Key research areas must address these constraints to enhance the sector's contribution to food security and livelihoods across all red meat sources.

Research should prioritize genetic improvement tailored to each species, including selective breeding programs and crossbreeding strategies to enhance growth rates, carcass quality, and disease resistance, while also preserving the unique adaptive traits of indigenous breeds like drought tolerance and heat resistance. For camel and ostrich meat production, research is needed to optimize husbandry practices and explore the genetic potential of Kenyan breeds. Pig research is needed to optimize management practices and enhance productivity. Sustainable grazing systems and climate-resilient livestock management practices are critical to mitigating the impact of climate change on red meat production, considering the specific needs of different species and production environments. Enhancing value addition and market access is essential for improving the competitiveness of Kenya's all red meat sources. Research should focus on strengthening compliance with international sanitary and phytosanitary (SPS) standards, developing innovative processing and packaging technologies suitable for diverse red meat products, and promoting the utilization of by-products to diversify revenue streams. Additionally, research into market-driven innovations such as halal-certified meat, organic production systems, and traceable meat products can unlock new market opportunities and cater to evolving consumer preferences across the red meat sector. In essence, the research agenda for the red meat value chain should be holistic, addressing both production and market-related constraints for beef, goat, mutton, camel meat, pork, and ostrich meat, while promoting sustainability, climate resilience, and inclusivity, thereby aligning with national initiatives like the Bottom-Up Economic Transformation Agenda (BETA) and regional frameworks such as the African Continental Free Trade Area.

2.2.3 Poultry

The sector is characterized by a dual structure, with commercial systems (broilers and layers) operating alongside indigenous smallholder production. Among the key challenges identified in the sector is low productivity among smallholders due to limited access to quality inputs and poor market linkages, as well as food safety concerns and disease risks like avian influenza. Poultry research areas in Kenya include improvement of smallholder productivity, affordable biosecurity measures, disease management, market access and value addition, and sustainable environmentally friendly production practices among others.[6]

2.2.4 Fish

Fish research in Kenya is primarily focused on enhancing aquaculture and sustainable fisheries management. Mainly through the Kenya Marine and Fisheries Research Institute (KMFRI). However, the fish industry faces several challenges including limited access to quality fish seed and feed, inadequate funding for research, and the need for better policies to support growth. The research needs for the value chain span from policy research in the sector to support evidence-based policy development, aquaculture development, feed and nutrition, and fisheries management practices.

2.2.5 Apiculture

Apiculture is a scientific and commercial practice of rearing, managing, and conserving honeybee colonies to produce honey and other bee products. It involves various practices including apiary establishment, colony management, feeding, and breeding. Apiculture is essential for pollination, biodiversity conservation, and economic development offering both ecological and financial benefits. Studies indicate that Kenya has the potential to produce up to 100,000 MT of honey annually. Honey demand in Kenya is much higher than the supply, making Kenya a net importer. According to FAO (2019), the national consumption estimated at 47,500MT was far above the national production of 25,573MT. An equivalent of 2% (511MT) of the total national production is exported, creating an annual supply deficit of about 22,500MT, underscoring the need for value chain improvements to bridge the demand gap and explore export opportunities (MoA&LD). The key challenges facing the apiculture value chain include low production and productivity, inadequate capacity in value addition and disorganized markets.

2.2.6 Pig

Pig production is a significant component of the livestock sector in Africa, contributing to both economic development and food security. They are mostly reared in rural parts of Africa by smallholder farmers, which explains why most of the pig population in most parts of Africa are indigenous breeds and their crosses (Adesehinwa *et al.*, 2024). The pig industry contributes approximately 5% of the livestock sub-sector output (KNBS, 2023). This contribution is below the potential of the sector, although the current upward growth of the pig value chain against a decline in other value chains is bound to reverse this trend. Research in Kenya's pig value chain focuses on several key areas: ASF disease management in resource-limited settings, cost-effective feed solutions, traceability systems, market infrastructure, value addition, gender inclusion, and governance support.

2.2.7 Camel

Research on the camel value chain in Kenya highlights its importance in pastoralist communities, particularly for camel meat and milk production. Despite the growing demand for camel products in urban areas, the sector faces challenges such as inadequate food safety measures, limited regulatory frameworks, and poor market access. Opportunities exist in enhancing the sector through research on improving food safety and hygiene practices, formalizing the sector through better regulatory frameworks, and exploring value-addition opportunities through milk processing. Other research areas include disease management and commercialization of camel products.

2.2.8 Rabbits

Rabbit farming in Kenya has experienced significant growth, transitioning from a hobbyist activity to a viable commercial venture. According to the 2019 Kenya Population and Housing Census conducted by the Kenya National Bureau of Statistics (KNBS), the country had a total of 605,983 rabbits. The predominant rabbit breeds in Kenya include New Zealand White; renowned for its rapid growth rate and high-quality meat production. Californian; Valued for its meat quality and adaptability to various environmental conditions. Chinchilla; Prized for its fur quality, catering to markets in the fashion industry, and Flemish Giant; Known for its substantial size, making it valuable for breeding purposes. The opportunities available in the rabbit sector include; growing demand for rabbit meat, export market potential, value addition and product diversification, low production costs, use in organic farming and agribusiness, and pet and research industry. The challenges in this sector include; limited market access, poor breeding practices, lack of standardized slaughter and processing facilities, high mortality rates, inadequate awareness and extension services, fluctuating feed availability and costs, and competition with other livestock products. In addition to researching in areas of the highlighted challenges, research should also focus on optimizing production through improved breeding, feeding using locally available resources, and welfare-conscious housing systems, to enhance meat quality and reproductive efficiency.

2.2.9 Leather

Leather represents a potential area for sustainable economic growth and employment and has been identified as a priority area for manufacturing under the Bottom-Up Economic Transformation Agenda (BETA) and is a critical area to the attainment of Kenya's development agenda. Proper handling of hides and skins, a by-product of various livestock sector value chains, ensures that the leather industry has access to adequate and quality raw materials. Critical research areas along with other livestock value chains on areas such as breeding, animal health, and value addition will contribute to improved quality of hides and skins. Especially regarding large-sized hides and skins, that are free from parasites and disease infestations and of good quality, which will provide for the manufacture of high-quality leather products. Undervalue addition and marketing thematic research area, leather, alongside other livestock sector products, has been captured as a key research area. To strengthen the leather value chain, research should focus on adopting slaughter technologies that minimize defects in hides and skins, exploring alternative preservation techniques to reduce post-slaughter losses, and optimizing hides and skins processing technologies to improve tanning capacity while mitigating the environmental impact of leather processing, and providing for impact assessment of existing leather sector policies or lack thereof in the last 10 years.

2.2.10 Non-Conventional Livestock

Non-conventional animals in Kenya, such as guinea pigs, quails, ostriches, cricket, and crocodiles, offer promising opportunities for diversification in the livestock sector. Despite their potential, these value chains face challenges such as poor market infrastructure, inadequate veterinary services, and limited established production systems due to limited research. Research areas in these animal value chains will focus on interventions to improve market linkages, enhance value addition, species diversification, potential products and byproducts, and adoption. Research in these animal value chains aims to unlock the full potential to provide for food security and economic growth.

2.3 LEGAL AND REGULATORY FRAMEWORK

The Legal and Regulatory frameworks governing livestock research include the Constitution of Kenya (CoK 2010), the Kenya Agriculture and Livestock Research Act (KALR) No., 17 of 2013, the Science, Technology and Innovation (ST&I) Act, No. 28 of 2013, Biosafety Act 2009, and the Universities Act, No 42 of 2012. These laws promote and underscore the central role of research in the country's development agenda.

The Constitution of Kenya, 2010, in the Fourth Schedule, confers the function of research to the National Government, making relevant Government ministries and agencies at the national level the central driving institutions in the management of research in the country.

The ST&I Act was enacted to facilitate the promotion, coordination, and regulation of the progress of science, technology, and innovation in the country; assign priority to the development of science, technology, and innovation; and entrench science technology, and innovation into the national production system. The Act establishes several institutions including the National Commission for Science, Technology and Innovation (NACOSTI) whose mandate is to assure quality in the science technology, and innovation sector and to advise the Government on research matters. The Act also established the National Research Fund (NRF) and the Kenya National Innovation Agency (KENIA).

The University's Act No 42 of 2012 identifies the promotion of quality research and innovation as core function of universities. The Universities Act Cap 210 provides the framework for the establishment of universities, some of which have faculties of agriculture and allied sciences. These universities undertake livestock research independently or in collaboration with other agricultural research institutions.

The Biosafety Act of 2009 was established to promote responsible research on genetically modified organisms, ensure their safe development and use to protect human health and the environment and establish a transparent, science-based process for decision-making regarding genetically modified organisms.

The KALR Act is the overarching statute that defines and provides direction for the conduct of agricultural research. The Act provides for the establishment and functions of the Kenya Agricultural and Livestock Research Organization (KALRO) and the coordination of agricultural research activities in Kenya.

Other legal instruments include Agricultural Sector Transformation and Growth Strategy 2019-2029, Sessional Paper No. 3 of 2020 on The Livestock Policy, Sessional Paper No. 2 of 2020 on the Veterinary Policy, Kenya Vision 2030, Agricultural Sector Development Strategy 2010–2020, Strategy for Revitalizing Agriculture of 2004, Economic Recovery Strategy for Wealth Creation and Employment of 2003.

The Sessional Paper No. 2 of 2020 on the Veterinary Policy and Sessional Paper No. 3 of 2020 on Livestock Policy 2020 (Sessional Paper No. 3 of 2020) aim to enhance research and innovation in Kenya's livestock sector by establishing a national institutional and legal framework for research coordination. The Sessional Paper No. 2 of 2020 on the Veterinary Policy on the other hand seeks to align interventions in the animal resource industry through animal health, production, welfare, food safety, and trade to the Constitution as well as the Kenya Vision 2030, Sustainable Development Goals and international animal health.

Other legal instruments governing livestock research include international treaties, conventions and multilateral arrangements that Kenya is party to and under which regional and international research and supporting organizations are established. Most of these institutions such as International Agricultural Research Centres (IARCs) have been granted privileges to carry out research and innovation in the country under Country bilateral MOUs and host agreements. Several NGOs involved in technology development and deployment are registered under the NGO Coordination Boards Act No. 19 of 1990, while other private entities are registered under various Acts of Parliament.

International and Regional initiatives in the sector include East African Community Agricultural and Rural Development Policy and Strategy (2011); standards and procedures of the World Trade Organization (WTO), World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO), the World Organization for Animal Health (WOAH, Codex Alimentarius Commission; NEPAD's Comprehensive Agricultural Development Programme; and, the Comprehensive Africa Agriculture Development Programme (CAADP) which is Africa's policy framework for agricultural transformation, wealth creation, food security and nutrition, economic growth and prosperity for all.

2.4 STAKEHOLDERS IN LIVESTOCK RESEARCH

Implementation of livestock research Agenda requires that all relevant stakeholders are involved and well-coordinated. The stakeholders in the livestock research realm comprise policy organs, regulators, funding agencies, implementers, research agencies, development partners, and beneficiaries as outlined in Annex 1.

CHAPTER 3: METHODOLOGY

The development of the National Livestock Research Agenda (NLRA) commenced in May 2022 by a team of technical experts sourced from the national research institutions, local Universities, and the Ministry of Agriculture and Livestock Development. The technical team was briefed on the task at hand by the Director of Livestock Policy Research and Regulations, State Department for Livestock Development, the Directorate spearheading this task. The technical team held two virtual meetings in early May 2022 to discuss and interpret the terms of references (TORs) provided. Thereafter, an action plan for the realization of the NLRA was developed.

The team of technical experts developed the first NLRA draft after conducting a detailed desk review of relevant research publications and policy documents addressing research within the livestock sector. The reviewed documents included Sessional Paper No. 3 of 2020 on the Livestock Policy, Sessional Paper No. 2 of 2020, the Veterinary Policy, National Agricultural Research System (NARS) Policy of 2012, Agricultural Sector Transformation and Growth Strategy 2019-2029, among other policies and regulations. In addition, the Tanzania Livestock Research Agenda, 2020-2025, and the National Research Priorities on Livestock and Poultry, 2017-2021 of Sri Lanka were reviewed.

The NLRA defined specific thematic research areas to address the research on the different livestock value chains including dairy, red meat, porcine, poultry, apiculture, fisheries, and aquaculture. In addition, thematic research areas address research on non-conventional livestock (ostrich. rabbit, guinea fowls, crocodiles, quails, high-value insects' production e.g. silkworm, shrimp culture and black soldier fly (BSF), equine and companion animals were also identified. The identified research thematic areas include breeds and genetic resources, feeds and feeding systems, animal health and welfare, value addition and marketing, cross-cutting issues (climate change, natural resource management, gender, and socio-economic issues), and capacity building. For each thematic area, the status, challenges, opportunities, and researchable areas in the different value chains were highlighted.

The NLRA draft was subjected to national validation by critical experts during a stakeholder engagement and consultative workshop. The stakeholders were drawn from different Ministry of Agriculture, Livestock, Fisheries & Cooperative Development, Kenya Meat Commission, national research institutions, Universities, regulatory bodies, Kenya Livestock Marketing Council, County governments, and NGOs.

The suggestions, recommendations, views, and comments that were made by stakeholders during the validation workshop were incorporated into the final NLRA document. The final NLRA draft will be handed over to the Principal Secretary, State Department for Livestock Development for official launching. The document is expected to be shared with all stakeholders and used for coordinating all livestock research and for prioritizing funding needs of livestock research in the country.

CHAPTER 4: THEMATIC AREAS

4.1 GENETIC RESOURCES, BREEDS, AND BREEDING TECHNOLOGIES

Overview

The livestock sector in Kenya has diverse locally adapted species including cattle, sheep, goats, camels, donkeys, poultry, pigs, bees, fish, and non-conventional livestock including ostrich, rabbits, quails and guinea fowls, silkworms, shrimps, black soldier fly (BSF) among others. Most of the genetic resources are indigenous.

Currently, there are several institutions involved in breed and genetic resources development, conservation, research, and regulation. These include the Kenya Animal Genetic Resource Centre (KAGRC), Livestock Recording Centre (LRC) for genetic evaluation, Agricultural Development Cooperation (ADC), Kenya Agriculture and Livestock Research Organization (KALRO), Directorate of Livestock Production (DLP) genetic conservation centers, International Livestock Research Institute (ILRI), Kenya Stud Book (KSB), Dairy Recording Service of Kenya (DRSK), and various Livestock Breeders Associations

Over the years, there have been minimal efforts towards characterization, monitoring and developing an inventory of the Animal Breeds and Genetic Resources. Consequently, this has led to limited breed improvement resulting in sub-optimal performance of the Genetic Resources. Most of the indigenous breeds, that are the most predominant, are either at risk of extinction or undergoing a continuous genetic dilution despite their resilience.

There is a need to develop a sustainable animal genetic resource to improve livestock productivity for food and nutrition security, income generation, and improvement of livelihoods.

There have been developed breeding programmes, including the National Dairy Cattle Breeding Programme, which involves progeny testing, contract mating, recording services for milk, and Artificial Insemination (AI) delivery services, and the Kenya Beef Recording Scheme that registers beef cattle and records data on the beef herd performance to inform beef improvement activities. Others are the Sheep and Goat Development Programme, which among other objectives, aims at enhancing the productivity of sheep and goats and raising their wool and meat output to further reduce pressure on beef and beef products. Several technologies have been introduced to improve the local breeds. These include artificial insemination (AI), Multiple Ovulation and Embryo Transfer (MOET), sexed semen and In-vitro fertilization. However, the uptake of these technologies is faced with challenges that can be addressed through research. Researchable areas cut across the dairy, red meat, porcine, poultry, apiculture, fisheries and aquaculture, and non-conventional livestock.

Objective

To enhance animal genetic resources development for higher productivity and improved resilience.

Research Areas

- Characterization (phenotypic and genotypic) of all Kenyan AnGR
- Localization mapping /monitoring trends of the population (where the genes are)
- Sustainable use and development of AnGR
- Alignment of breeds to environments
- Align breeds with the production environment
- Characterization of breed effects on the environment
- Breed inventory and characterization of livestock types
- Livestock breed selection and agroecological zones matching
- Multiplication of improved germplasm and conservation of genetic resources
- Establish a national performance recording system to facilitate the implementation of the national breeding program
- Analysis of appropriate breeding systems
- Analysis of breeding policy and legal framework
- Document Indigenous knowledge on AnGR management by various communities
- Community-based breeding programs
- Alignment and characterization of animal breeding technologies
- Conservation methods -ex-situ, e.g. gene banking/in situ
- Framework for regional harmonization, exchange, and adoption of sharable reproductive technologies (e.g., technology for semen sexing)
- Precision breeding linked to disease, heat, and drought resistance
- Genetic knowledge dissemination and management

4.2 FEEDS AND FEEDING SYSTEMS

Overview

Livestock feeds are a valuable resource that provides the practical application of nutrition to produce effective, high-producing commercial livestock. The effects of feeding and management of livestock feeds have direct implications on production systems, food safety, and the environment. Water is a critical but often overlooked component of livestock nutrition

Livestock production in Kenya is constrained by inadequate feed quantity, and quality, high costs, and poor storage facilities for feed conservation. There is a proliferation of unregulated commercial feed manufacturers in the market resulting in poor and unsafe feeds and minerals. There is thus a need to ensure standards and regulations are adhered in the feed manufacturing industry. Limited research information on how to make and utilize rations from locally available feed resources has further compounded feeding challenges. The use of cheap and readily available local feed resources has great potential to increase livestock productivity.

Established opportunities for improvement include on-farm production and utilization of fodder, efficient storage, processing and utilization of crop residues, pasture improvement, appropriate water harvesting technologies, formulation of feed rations, feed conservation and development of fodder markets. Given the complex farming system particularly for the smallholder farmers, there is need for changes in technologies needed for improving feeds, feeding systems, institutional and policy arrangements surrounding feed supply.

The situation of companion animal feeds in Kenya reveals a growing industry driven by increasing pet ownership, urbanization, and a rising middle class. However, challenges persist, including limited access to high-quality raw materials, high production costs, and inadequate regulatory enforcement, leading to variability in feed quality.

Additionally, most locally available pet feeds do not meet optimal nutritional standards, forcing many pet owners to rely on expensive imported alternatives. There is also a knowledge gap among pet owners and feed manufacturers regarding balanced nutrition for different companion animals. Despite these

Objective

challenges, opportunities exist in formulating affordable, high-quality pet feeds using locally available ingredients, investing in research and development, and strengthening regulatory frameworks. The growing demand for companion animal nutrition education and the rise of specialized veterinary services further create a promising market for innovative, nutritionally balanced, and sustainable pet feed solutions in Kenya.

Consequently, there is a need for technological and innovation development to improve locally available livestock feed resources and feeding systems. To address the constraints above and improve feed quality and safety, hence improve livestock production and productivity, some research thematic areas have been identified.

Objective

To optimize animal feed production, conservation, quality, and safety in Kenya by developing sustainable feed resources and enhancing local production systems, ensuring compliance with international safety standards to improve sector resilience and efficiency.

Research Areas

Feed production and management

- Nutritional and biomass potential with agroecological suitability of introduced fodder varieties (e.g. Super Napier grass)
- Feed formulation and optimization
- Animal feed preservation and storage
- Alternative protein sources /feed resources for livestock
- Feed resource efficiency and precision nutrition
- Innovative pasture and fodder and fodder management systems
- Supplementation levels per production system for all livestock categories
- Use of locally available crops or plants as sources of enzymes and probiotics for the improvement of livestock feed
- Fodder and pasture breeding for multiplication for different ecological zones
- Alternative protein sources for pet feeds
- Water supplementation in feed formulation
- Alternative water sources for livestock in arid and semi-arid lands (ASALs)

Feed Conservation

- Innovative or alternative methods of fodder conservation
- Use of biodegradable methods of fodder conservation such as silage making
- Feed loss, waste, and management
- Exploration and validation of performance of non-conventional feed resources
- Innovations in fortifying crop residues to improve their nutrition characteristics

Functional Feeds and Animal Health

- Development of medicinal and functional feeds (e.g., herbs, prebiotics, essential oils).
- Use of immune-modulatory feeds to reduce antibiotic dependency.
- Nutritional strategies for mitigating mycotoxin contamination in feeds.
- Functional and medicinal ingredients in pet feeds
- Water quality and animal performance
- Water intake and nutrient absorption

Sustainable and Climate-Smart Resilient Feed Resources

- Breeding and utilization of indigenous rangeland grasses and fodder trees (e.g., for ASAL regions).
- Development of drought-tolerant forages for resilience in climate change
- Ways of improving seed systems and agronomic practices for climate-resilient forage species
- Management of invasive species
- Use of agro-industrial byproducts (e.g. brewer's grains, molasses, oilseed cakes) to reduce feed costs and waste.
- Rangeland forage diversification to mitigate climate
- Formulation of climate-smart and sustainable pet feeds
- Climate change and water requirements for livestock

Feed Quality and Safety

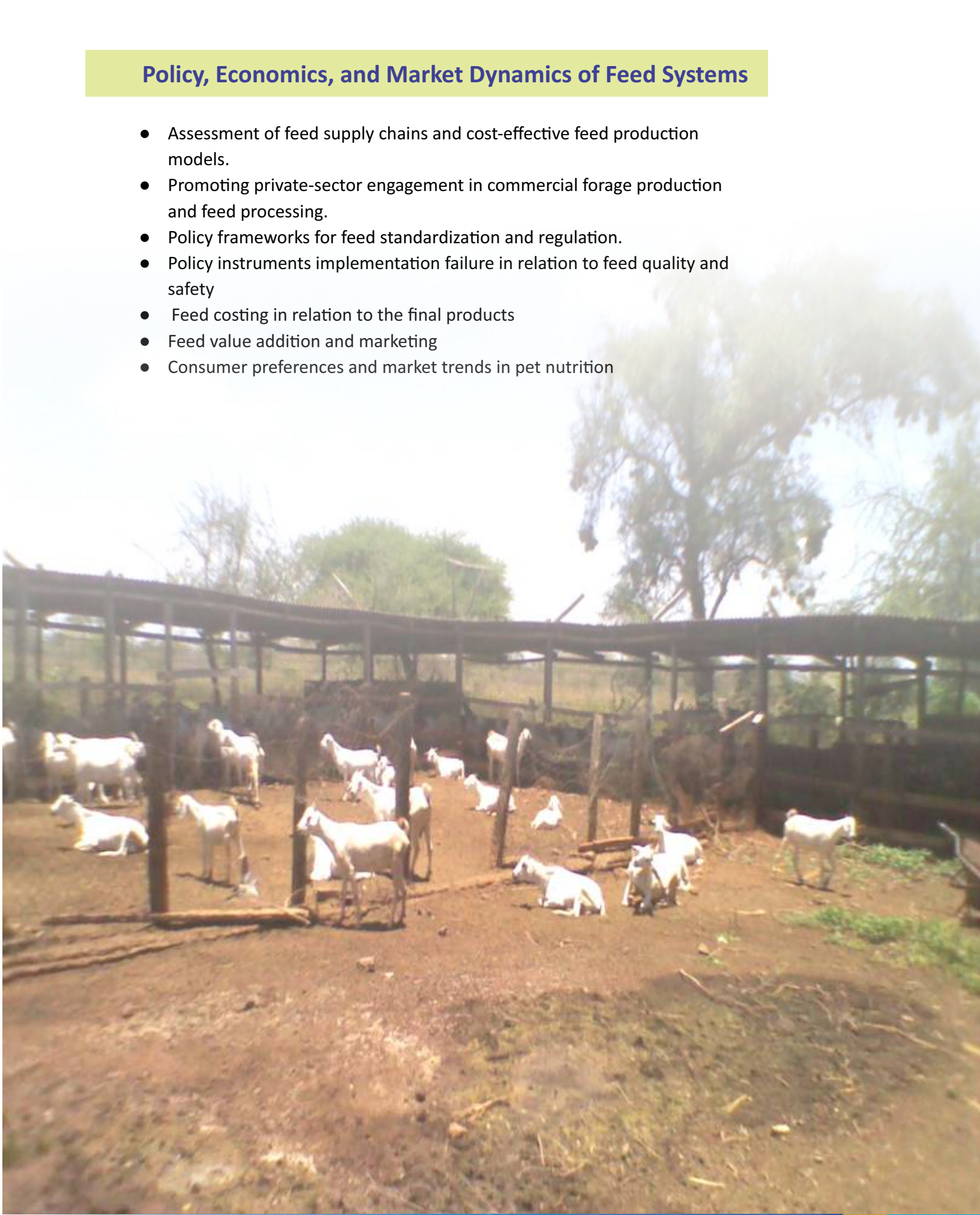
- Fermentation and ensiling of low-quality roughages for enhanced digestibility.
- Application of feed additives (enzymes, probiotics, tannins) to improve feed efficiency.
- Pelleting and extrusion technologies to optimize feed intake and digestibility.
- Traceability technologies to ensure feed safety and quality
- Mycotoxin contamination in livestock feeds and strategies for detoxification.
- Heavy metal accumulation in livestock feeds and its impact on animal and human health.
- The role of organic and regenerative agriculture in improving feed safety and nutritional quality.
- Nutritional evaluation of homemade vs. commercial pet diets
- Specialized nutrition for different companion animals
- Quality control and safety of pet feeds in Kenya

Digitization and Precision Feeding Technologies

- Use of artificial intelligence (AI) and remote sensing for pasture monitoring and feed demand forecasting.
- Adoption of smart feeding technologies
- Development of innovative technology to map feed resources in Kenya to establish carrying capacity, especially in rangelands

Policy, Economics, and Market Dynamics of Feed Systems

- Assessment of feed supply chains and cost-effective feed production models.
- Promoting private-sector engagement in commercial forage production and feed processing.
- Policy frameworks for feed standardization and regulation.
- Policy instruments implementation failure in relation to feed quality and safety
- Feed costing in relation to the final products
- Feed value addition and marketing
- Consumer preferences and market trends in pet nutrition



4.3 ANIMAL HEALTH, HUSBANDRY AND WELFARE

Overview

While we appreciate that Kenya's livestock sector is a cornerstone of the country's economy and food security, providing livelihoods for millions of pastoralists and small-scale farmers, the sector faces significant challenges related to animal health, husbandry practices, and animal welfare, which impact productivity, profitability, and broader societal livelihood. Animal health is a critical research area, with frequent outbreaks of zoonotic diseases such as Rift Valley fever and African swine fever necessitating improved disease surveillance systems, enhanced veterinary capacity, and a One Health approach to mitigate risks. Additionally, the rise of antimicrobial resistance (AMR) underscores the need for alternative disease management strategies and biosecurity measures.

Research in husbandry practices is essential for enhancing livestock productivity and sustainability. This includes exploring climate-smart agriculture (CSA) strategies to improve resilience in the face of climate change, such as adopting drought-tolerant breeds and implementing efficient water management systems. Furthermore, modern technologies like precision livestock farming and digital tools can enhance efficiency and decision-making in husbandry, but their adoption is hindered by limited access to technology and weak linkages between farmers and research institutions. Animal welfare is increasingly recognized as a critical component of sustainable livestock production. Ethical considerations in animal handling, transport, and slaughter are essential for maintaining market access and consumer trust, particularly in export markets. Kenya needs to formalize and enforce animal welfare standards, aligning with international benchmarks such as those set by the World Organization for Animal Health (WOAH). Research in these areas should align with these sector needs. Training programs for farmers, traders, and slaughterhouse operators are crucial for ensuring compliance with these standards and promoting humane practices throughout the value chain. This aligns with research needs in policy development and implementation to support animal welfare.

To address these challenges and opportunities, Kenya's research agenda should focus on areas that hinders the realization of the desired standards of animal health, husbandry practices and animal welfare. This will accelerate the transformation of the livestock sector into a more resilient, sustainable, and equitable contributor to national development.

Ultimately, addressing the research needs in animal health, husbandry, and welfare will require a collaborative approach involving policymakers, researchers, farmers, and other stakeholders. This collaboration is essential for developing evidence-based policies, improving extension services, and enhancing the overall efficiency and sustainability of the livestock sector. By aligning research priorities with practical needs and policy objectives, Kenya can ensure that its livestock sector contributes effectively to food security, economic growth, and environmental sustainability.

Objective

To improve Animal Health, Husbandry and Welfare

Research Areas

Animal Health

- Mapping and surveillance of diseases of the bees, fisheries, camel, and non-conventional animals.
- Improving market access through understanding hindrances to compliance with international standards for animal health
- Parasites and vectors and their control strategies
- One Health approaches to address zoonotic diseases and AMR
- Livestock disease threats – priority, transboundary, emerging or reemerging, vector-borne, diseases at livestock-wildlife interface, metabolic, reproductive.
- Development of diagnostic tools and medical devices
- Infectious and non-infectious disease (parasitic, metabolic, reproductive) – etiology, epidemiology, economics, sociocultural.
- Human-livestock-wildlife-environmental interaction (zoonoses, One Health)
- Efficacious, safe, and quality vaccines, antivenoms, pharmaceuticals, and pesticides.
- Ethno-veterinary medicine, practices and bioprospecting. (Indigenous community knowledge of disease diagnostics and management)
- Antimicrobial use and resistance – mapping, surveillance, mitigation strategies
- Integrated Data Management System for Animal Health and Livestock Identification and Traceability.
- Integrated Disease Management System
- Food safety (Diseases and hazards of public health importance) – Risk Assessment of systems that offer preventive and corrective measures.

Animal Welfare

- Animal welfare standards
- Housing
- Transport
- Nutrition and Feeding
- Animal environment enrichment e.g. Social, physical, nutritional
- Pain management and humane handling
- Stress identification and management - Diagnostic markers.
- Capacity building and knowledge sharing – Public awareness assessment and studies
- Husbandry practices –e.g. debeaking, tail docking.
- Growth enhancers impact on animal welfare
- Alternatives to animal models–e.g. In vitro methods
- Precision livestock farming for welfare monitoring – Use of AI
- Evaluating the effectiveness of existing animal welfare policies
- Animal acclimatization
- Euthanasia

Husbandry

- Developing climate-resilient livestock systems
- Housing and environmental enrichment
- Ways of enhancing farmer capacity through technology and training
- Rangeland management for disease control
- Neonatal and young stock care and management
- Hygiene practices
- Assessing the impact of climate change on livestock productivity

4.4 VALUE ADDITION AND MARKETING

Overview

Value addition and marketing are pivotal to unlocking the full potential of Kenya's livestock sector. Despite this significance, the sector faces challenges such as post-harvest losses, weak market linkages, and price volatility. Over 60% of farmers sell raw products at low prices, limiting profitability and economic growth. Research in value addition aims to address these challenges by improving traceability, processing, packaging, and branding to enhance product quality and marketability. Investments in innovative preservation technologies and cold chain infrastructure are critical for minimizing inefficiencies, reducing losses (estimated at 30% for meat and 20% for milk), and expanding market reach both domestically and internationally.

Optimizing the utilization of livestock by-products is another critical area for research. Currently, less than 30% of by-products such as hides, skins, bone meal, and organic fertilizers are effectively utilized, leading to economic losses and environmental waste. Expanding applications in industries like leather processing, bioenergy production, and organic fertilizers can create diversified revenue streams while promoting sustainability through circular economy principles. For instance, only 15% of Kenya's hides and skins are processed into finished leather, with most exported in raw form. Enhancing value addition in these areas not only boosts job creation but also reduces the environmental footprint of livestock production.

Market access remains a significant constraint for Kenya's livestock sector due to weak compliance with international sanitary and phytosanitary (SPS) standards. Currently, only 4% of beef production meets export standards, restricting access to premium global markets. Research focusing on strengthening food safety regulations, improving certification systems, and modernizing processing technologies is essential for enhancing competitiveness. Additionally, leveraging digital platforms such as e-commerce marketplaces and blockchain-enabled traceability systems can revolutionize livestock marketing by improving transparency, reducing transaction costs, and expanding market access locally and globally.

Aligning value-addition efforts with national priorities like the Bottom-Up Economic Transformation Agenda (BETA) and regional frameworks such as the African Continental Free Trade Area (AfCFTA) will enhance economic resilience while increasing foreign exchange earnings. Value addition and marketing represent transformative opportunities for Kenya's livestock sector by boosting farmer incomes, creating employment in agro-processing industries, improving food security through reduced losses, and enhancing competitiveness in domestic and international markets. By prioritizing research in sustainable processing technologies, effective utilization of by-products, compliance with international standards, and digital marketing innovations, Kenya can unlock the full potential of its livestock industry while advancing national development goals under frameworks like BETA and the Sustainable Development Goals (SDGs).

Objective

To boost livestock sector value addition and market competitiveness through innovative technologies, and research that drives farmer incomes growth and sustainable economic development.

Research Areas

- Inventory of livestock product processing facilities (availability, capacity, and efficiency).
- Cold chain infrastructure assessment
- Evaluating the presence and effectiveness of laboratories, certification bodies, and regulatory institutions ensuring adherence to national and international standards.
- Identifying key livestock production zones, distribution networks, and market linkages to optimize resource allocation.
- Mapping human resources, technical expertise, and training institutions supporting the livestock processing industry to address skill gaps.
- Advancing livestock products processing techniques to improve quality and efficiency.
- Strategies to minimize losses in the livestock sector through improved handling, storage, and preservation.
- Ways of strengthening cold chain infrastructure.
- Ensuring livestock products fulfill sanitary and phytosanitary requirements to enhance market access.
- Efficient technologies for value addition in by-product processing
- Identifying local and international demand, pricing dynamics, and opportunities for commercializing processed by-products.
- Waste reduction and circular economy
- Assessing existing policies and regulations governing by-product utilization to enhance compliance and investment incentives.
- Technology and innovation in product development
- Effective digital traceability systems to monitor livestock products from farm to market.
- Gaps in livestock product processing and handling.
- Barriers to export growth and development strategies to align Kenyan livestock products with global market requirements.
- Product diversification and innovation (e.g. organic products, Halal-Certified products, functional foods, niche market development, market-driven certification, and branding)

- Sustainable products preservation methods
- Market scope, access and value chain integration
- Analysis of current and projected market demand for value-added products.
- Identifying challenges faced by smallholder livestock farmers in accessing formal markets
- Digital market platforms to connect farmers with buyers and enhance market transparency.
- Value chain integration opportunities
- Consumer preferences and market trends
- Digital marketing and E-commerce adoption

4.5 LIVESTOCK RESOURCE INFORMATION MANAGEMENT

Overview

Livestock Resource Information Management (LRIM) is crucial for enhancing productivity, sustainability, and resilience in Kenya's livestock sector. Despite contributing significantly to the national GDP and supporting millions of households, the livestock sector suffers from fragmented data and limited access to reliable information on key resources such as rangelands, water, feed, and livestock populations. This lack of comprehensive information hinders effective planning, decision-making, and resource allocation, leading to inefficiencies, underutilization of resources, and increased vulnerability to climate change and other shocks. A robust LRIM system is essential for optimizing resource use, improving livestock productivity, and promoting sustainable development in the sector.

The livestock research agenda must prioritize the development and implementation of a comprehensive LRIM system that integrates data from various sources, including remote sensing, ground surveys, and digital livestock registries. This system should provide timely and accurate information on livestock populations, grazing resources, water availability, disease outbreaks, market prices, and other critical parameters. Furthermore, it should incorporate geospatial technologies to map and monitor rangelands, identify areas of degradation, and optimize grazing20 management practices. By leveraging data-driven insights, policymakers, researchers, and livestock producers can make informed decisions, allocate resources effectively, and mitigate risks.

Objective

To establish a collaborative livestock resource information management platform that provides data and analytics for stakeholders, enabling actionable insights and evidence-based decisions.

Research Areas

- Innovative tools and technologies for data collection, analysis, and dissemination.
- Challenges of data interoperability and standardization, to ensure that data from different sources is easily integrated and analyzed.
- Capacity building and training programs to equip livestock producers, extension officers, and policymakers with the skills and knowledge needed to effectively use LRIM tools and technologies.
- Socio-economic and policy dimensions of LRIM.
- Impact of information access on livestock productivity, market access, and livelihoods.
- Policy and institutional frameworks to support the sustainable management of livestock resources and promote equitable access to information.
- Modernization of Information and Communication Technology (ICT) infrastructure for livestock, disease, production, and infrastructure data storage, access, and sharing.
- Establish a livestock-associated resource database.
- Establish a coordination framework for data and information management and sharing protocol.
- Historical, current, and predictive scenarios of risks, vector and disease trends, vaccines and coverage, and production decisions and trends across livestock and associated subsectors.
- Data analytics programmes to provide insights, data, and information products for the farmers, human-animal health, production, and extension professionals for the preservation of human, animal, and environment health, market trends, climate adaptation, and mitigation, and innovative approaches for the sector.
- Digitize and upgrade manuals, reports, library/referencing services

4.6 SOCIO-ECONOMIC ISSUES

Overview

Socio-economic considerations are paramount to unlocking the full potential of Kenya's livestock sector, recognizing that technological advancements alone are insufficient. The success and sustainability of interventions hinge on understanding the complex interplay of cultural, social, economic, and political dynamics that influence livestock-dependent communities. The livestock research agenda must prioritize analyzing rural livelihoods and motivations behind investment decisions, acknowledging the impact of gender, ethnicity, and social status on access to resources, markets, and information.

Furthermore, research must address the socio-economic impacts of climate change, market fluctuations, and policy changes on livestock communities, with a focus on enhancing resilience and adaptive capacity. Understanding the political economy of the sector is crucial, examining how policies, laws, and regulations shape the interests of value chain actors. Key economic challenges include low household income, limited market access, poorly organized market systems, and under-investment. Climate risks, low adoption of risk transfer tools, frequent disease outbreaks, insecurity, and resource-based conflicts also significantly impact the sector's performance.

To address these multifaceted challenges, the research agenda should prioritize the identification and promotion of sustainable livelihood strategies, risk mitigation measures, and inclusive policies that support vulnerable populations. It should also focus on improving market access and value chain integration, reducing transaction costs, and enhancing the competitiveness of Kenyan livestock products. By integrating socio-economic considerations into livestock research, Kenya can ensure that the sector contributes to inclusive and sustainable development, improving livelihoods, preserving cultural heritage, and promoting social equity for all stakeholders. Ultimately, this holistic approach will enable the livestock sector to fulfill its potential as a driver of economic growth, food security, and social well-being in Kenya.

Objective

To **address socio-economic and cultural dimensions of livestock production**

Research Areas

- Impact of factors such as gender, ethnicity, and social status on access to resources, markets, and information.
- Vulnerability of different groups to shocks like climate change, market fluctuations, and policy changes and strategies to enhance their resilience.
- Social safety nets, e.g. insurance schemes, access to credit facilities, and alternative livelihood options
- Influence of cultural beliefs, indigenous knowledge, and pastoralist traditions on livestock management.
- Gender roles and access to resources
- Cultural attitudes towards livestock health
- Consumption patterns and preferences
- Intra-household relationships and decision-making dynamics in livestock management, resource allocation, and income distribution.
- Social norms and livelihoods
- Land tenure and resource Conflicts
- Evolution of the role of livestock in the community
- Welfare of value chain actors in the livestock sector
- Analyzing market access and value chain efficiency to inform the development of efficient market information, aggregation, market infrastructure, and enhanced productivity, among others.
- Impact of government policies on subsidies, trade regulations, and market development support.
- Evaluating financial inclusion, risk mitigation, and credit access
- Contribution of livestock to GDP, job creation, household incomes
- Economic impact assessment of livestock diseases
- Impact of Government policies on research and innovation
- Impact of government funding on research sustainability and innovation
- Alternative financing mechanisms for public-private partnerships
- Trade policies and international relations
- Institutional optimization for service delivery

4.7 FOOD SAFETY

Overview

Food safety is a paramount concern in Kenya's livestock sector, impacting public health, trade prospects, and economic stability. Contaminated food poses serious health risks, limits access to lucrative export markets and threatens the livelihoods of livestock producers and traders. Key challenges include managing food-borne diseases, meeting stringent export requirements, and improving safety standards in local food markets, where unsafe handling, poor sanitation, and contamination are prevalent. Bacteria such as Salmonella and E. coli, viruses like Hepatitis A, and harmful chemicals such as pesticides and food additives are major culprits, posing significant threats to public health and economic well-being.

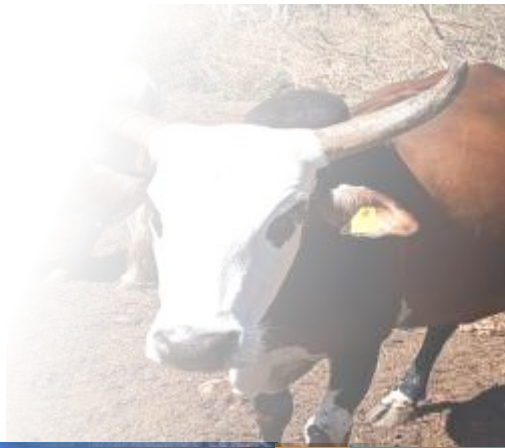
The livestock research agenda must prioritize addressing these challenges through targeted investigations and innovative solutions. Research should focus on assessing the prevalence and impact of food-borne pathogens and chemical contaminants in key livestock value chains, assess existing food safety regulations, and promote strategies for improving food safety practices along the livestock value chains. By addressing the multifaceted challenges responsible for food safety concerns, Kenya can strengthen its food safety systems, safeguard public health, and enhance the sustainability and resilience of its livestock sector. Ultimately, the goal is to develop evidence-based policies and practices that ensure the safety and quality of livestock products, protect public health, and enhance the competitiveness of Kenya's livestock sector in domestic and international markets.

Objective

To improve food safety and protect consumers by reducing contamination risks, promoting compliance with standards, and ensuring access to safe foods of animal origin in Kenya.

Research Areas

- Prevalence and impact of food-borne pathogens and chemical contaminants in key livestock value chains
- Effectiveness of existing food safety regulations and enforcement mechanisms, identifying gaps and areas for improvement
- Cost-effective and sustainable strategies for improving food safety practices at all stages of the livestock value chain
- Chemical preservative use and residues in livestock products.
- Use of prese rvatives, their effectiveness, and associated health risks,
- Natural preservatives, such as natural extracts, bio-preservatives, and improved storage techniques, to reduce reliance on synthetic chemicals.
- Antimicrobial resistance (AMR)
- Strategies for disease prevention and control, such as improved biosecurity measures, vaccination programs, and the use of probiotics and prebiotics.
- Socio-economic drivers of antibiotic misuse and interventions to promote responsible antibiotic use practices among livestock farmers.
- Foodborne diseases based on value chains
- Surveillance of food safety
- Awareness of the importance of food-borne diseases e.g. effective risk, communication. Here address cross-cutting issues e.g. policy, politics, and technologies
- Risk assessment methodologies for prioritizing food safety intervention in Kenyan food systems
- Surveillance systems for food-borne diseases and pathogens.
- Impact of climate change on food safety
- Residue monitoring/traceability
- Communication on food safety
- Safety of non-conventional feed sources
- Adulteration and shelf life



4.8 COMPANION ANIMALS AND ANIMALS USED IN RESEARCH

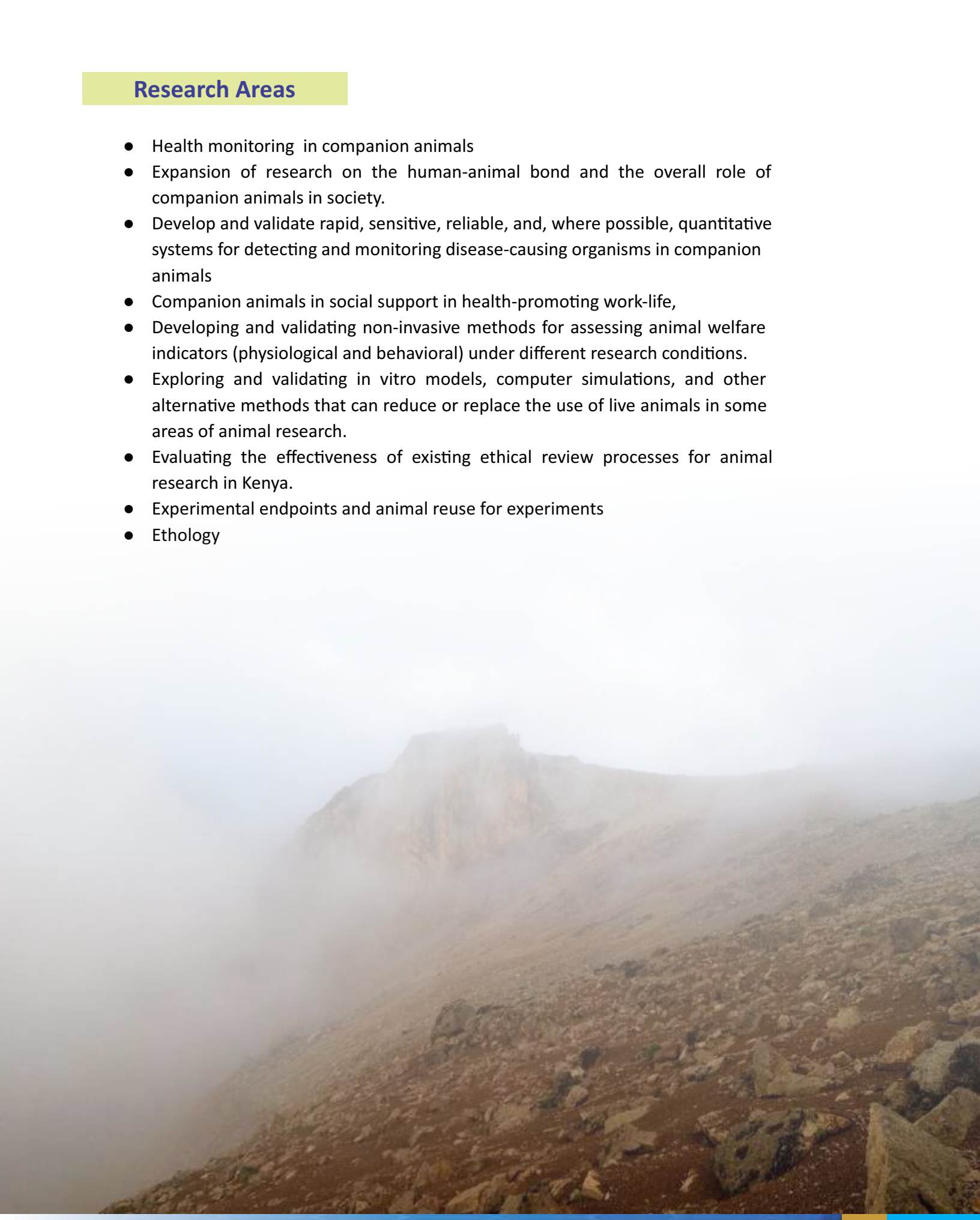
Overview

Companion animals: This group of animals are usually kept for company rather than economic reasons. In Kenya, dogs and cats are the most popular pets although it is not uncommon to find people keeping rodents such as gerbils, hamsters, chinchillas, fancy rats and guinea pigs; avian pets, such as canaries, parakeets and parrots; reptile pets, such as turtles, lizards and snakes; aquatic pets such as tropical fish and frogs and arthropod pets such as tarantulas and hermit crabs. The human animal bond can be traced back to the time of domestication, this dynamic relationship between people and animals has been shown to influence the psychological and physiological state of the involved man and animal. There are numerous examples of the important role of dogs and cats in society, religion, art and science and early recognition of the benefits of interaction with these companion animals. In the 19th century, animals were commonly found in mental health institutions with the promotion of a pet for chronically ill patients for an increased sense of well-being. Since then, formal scientific documentation of such benefits has emerged.

Animals in Research: Animal research as espoused within the National Livestock Research Agenda is crucial for advancing scientific knowledge through biomedical research, especially in veterinary medicine, agriculture, production, and environmental science. In Kenya, this is particularly relevant in addressing local health challenges, such as malaria, tuberculosis, vaccine development, and emerging diseases, where animal research can lead to breakthroughs in treatment, and prevention strategies, and enhance our understanding of drugs and drug residues, food safety, drug resistance, behavior, among other issues. In addition, animal use in research is vital in agriculture to improve livestock productivity, disease resistance, and food security, which are critical issues for the country. Broader areas to be considered include the implementation of the 3Rs—replacement, reduction, and refinement.

Research Areas

- Health monitoring in companion animals
- Expansion of research on the human-animal bond and the overall role of companion animals in society.
- Develop and validate rapid, sensitive, reliable, and, where possible, quantitative systems for detecting and monitoring disease-causing organisms in companion animals
- Companion animals in social support in health-promoting work-life,
- Developing and validating non-invasive methods for assessing animal welfare indicators (physiological and behavioral) under different research conditions.
- Exploring and validating in vitro models, computer simulations, and other alternative methods that can reduce or replace the use of live animals in some areas of animal research.
- Evaluating the effectiveness of existing ethical review processes for animal research in Kenya.
- Experimental endpoints and animal reuse for experiments
- Ethology



4.9 CROSS-CUTTING ISSUES

Cross-cutting issues offer entry points for analyzing themes and understanding the network of interconnections throughout livestock systems. They are grouped according to shared characteristics: health, environmental pollution, gender, education and urbanization, climate change, changing environments and resource use. While each issue provides useful entry points into livestock themes, it is important to outline the state of the environment and policy context for each one. As the deficiencies in our traditional issues-based approach to environmental assessment limit our ability to consider truly transformative pathways, cross-cutting and more integrated approaches are essential and must ultimately displace those based on single-issue analyses. Therefore, an analysis of selected cross-cutting issues that illustrate the pressing need for more integrated and transformative policy responses is needed.

The cross-cutting issues selected for this assessment are chosen because of their close alignment with needs for livestock production research in Kenya and in response to the SDGs. Given the intersections among these cross-cutting issues, research will focus on climate change, natural resource management, biotechnology, policies, knowledge, information management and outreach, and capacity building.

Objective

To a **ddress cross-cutting issues affecting livestock research and development**

4.9.1 Climate change

Overview

Climate change is driven by modifications in atmospheric composition due to land-use change, primarily deforestation, and to greenhouse gas (GHG) emissions, such as CO_2 emitted through fossil fuel burning and methane released from agriculture and other sources, including emissions of aerosol particles.

Climate change impacts the livestock sector by reducing livestock productivity due to reduced water and feed availability. Incidences such as droughts, floods and strong winds have led to loss of livestock investments, incomes and livelihoods. Consequently, livestock has been affected by drought leading to death of animals, emergence and re-emergence of traditional and new diseases, and spread of pests.

Some of the challenges faced in addressing climate change and its impacts include inadequate early warning and preparedness; inappropriate technologies for production, transport and processing of livestock and livestock products; inappropriate breeds and forage varieties; and inadequate disaster preparedness to ensure recovery after an extreme weather event

Research areas

- Low carbon livestock production
- Drought tolerant animal feeds
- Quantification of Greenhouse gases (GHG) emissions from Livestock.
- Climate change adaptation and mitigation (Smart Agriculture).
- Integration of Indigenous Technical Knowledge (ITK) into climate change.
- Climate change financing (Carbon Credit).

4.9.2 Natural Resource Management

Overview

Sustainable natural resource management (NRM) has been highly prioritized for better ecosystem health (Gok, 2018). Future growth and development of the agricultural sector will rely on prudent sustainable intensification of land use in the high-medium rainfall areas and innovative use of the ASALs, considering the limited water resources available in the country.

Sustainable resource use requires sound management of renewable resources and aims to recycle non-renewable resources, leading to the concept of a circular economy in which a waste, the by-product of a process, becomes a raw material for another process. In a circular economy, efficient use of resources across their entire life cycle is critical: from extraction to manufacturing, through consumption and use, to recycling and reuse.

Research Areas

- Natural resource management technologies
- Balance between productivity and environmental services
- Environmental protection for sustainable livestock management.
- Biodiversity and conservation of genetic resources
- Biosecurity measures for safe food and development
- Bioremediation and conversion of waste into usable products (circular economy)
- Rehabilitation of degraded Livestock Resources
- Bio-mining
- Biodegradation
- Human-Wildlife-Livestock interaction
- Environmental technologies
- Integration of circular economy in livestock sector
- Biofuels
    - Renewable energy
    - Solid waste management
    - Livestock waste management

4.9.3 Policies associated with the Livestock Sector

Policy plays a pivotal role in shaping the growth, sustainability, and competitiveness of Kenya's livestock sector. Effective policies, legislations, regulations and other policy instruments provide the framework for regulating animal health, resource management, trade, and food safety while addressing socio-economic challenges such as gender equity, financial inclusion, and climate resilience. However, the sector faces significant policy gaps, including weak enforcement of existing regulations, fragmented governance structures, and challenges in alignment with international standards. These gaps hinder the sector's ability to meet domestic and export market requirements, reduce post-harvest losses, and optimize resource utilization. Strengthening policy frameworks through research-driven insights is essential to create an enabling environment that fosters innovation, inclusivity, and economic growth. Collaboration among government agencies, research institutions, private sector stakeholders, and development partners is vital for ensuring that policies are evidence-based and responsive to the needs of all value chain actors. By addressing the identified critical policy issues through targeted research and stakeholder engagement, Kenya can build a resilient livestock sector that contributes to food security, economic growth, environmental sustainability, and improved livelihoods for millions of Kenyans.

Research areas

- Evaluating existing policies to identify inefficiencies and inconsistencies that impede sectoral development (land tenure, trade regulations, environmental sustainability, and compliance with international sanitary and phytosanitary (SPS) standards etc.).
- Explore how policies can incentivize value addition, sustainable climate smart technologies, productivity enablers, unlock markets
- Assessing how current policies are adaptable to emerging challenges such as antimicrobial resistance (AMR), climate change impacts on livestock systems
- Integration of digital technologies into resource management and traceability systems.
- Developing inclusive policies that promote equitable access to resources and opportunities for smallholder farmers, women, and youth
- Policies that enhance collaborations and synergies among the sector players
- Policy analysis, implementation and monitoring
- Public participation methodologies
- Livestock research funding.
- Livestock research regulatory structures and management systems
- Livestock research governance.
- Regional and international policies, treaties, conventions and protocols
- Policies impact on livestock research
- Animal rights and freedoms

4.9.4 Technologies, Innovations, and Management Practices (TIMPs) and Biotechnology

Technologies, Innovations, and Management Practices (TIMPs) are essential for driving growth, sustainability, and resilience in Kenya's livestock sector. TIMPs encompass a wide range of interventions, including improved breeding techniques, climate-smart feeding systems, disease control strategies, and digital innovations for data management and market access.

The adoption of TIMPs is critical to addressing persistent challenges such as low productivity, high input costs, and vulnerability to climate change. However, the uptake of these technologies remains limited due to socio-economic barriers, inadequate extension services, and weak linkages between research institutions and farmers. The livestock research agenda must prioritize the development, validation, and dissemination of context-specific TIMPs that are accessible, affordable, and scalable for smallholder farmers. This facilitates dissemination, adoption and utilization of the various research findings and innovations in the livestock sector.

Furthermore, it simplifies sharing of the TIMPs with different target beneficiaries including scientists, extension officers, value chain actors (producers, processors, transporters, consumers) and policy makers. Integration of biotechnology into TIMPs offers particularly transformative potential to enhance productivity, resilience, and value addition and address critical challenges such as low productivity, disease vulnerability, and market access constraints.

Research Areas

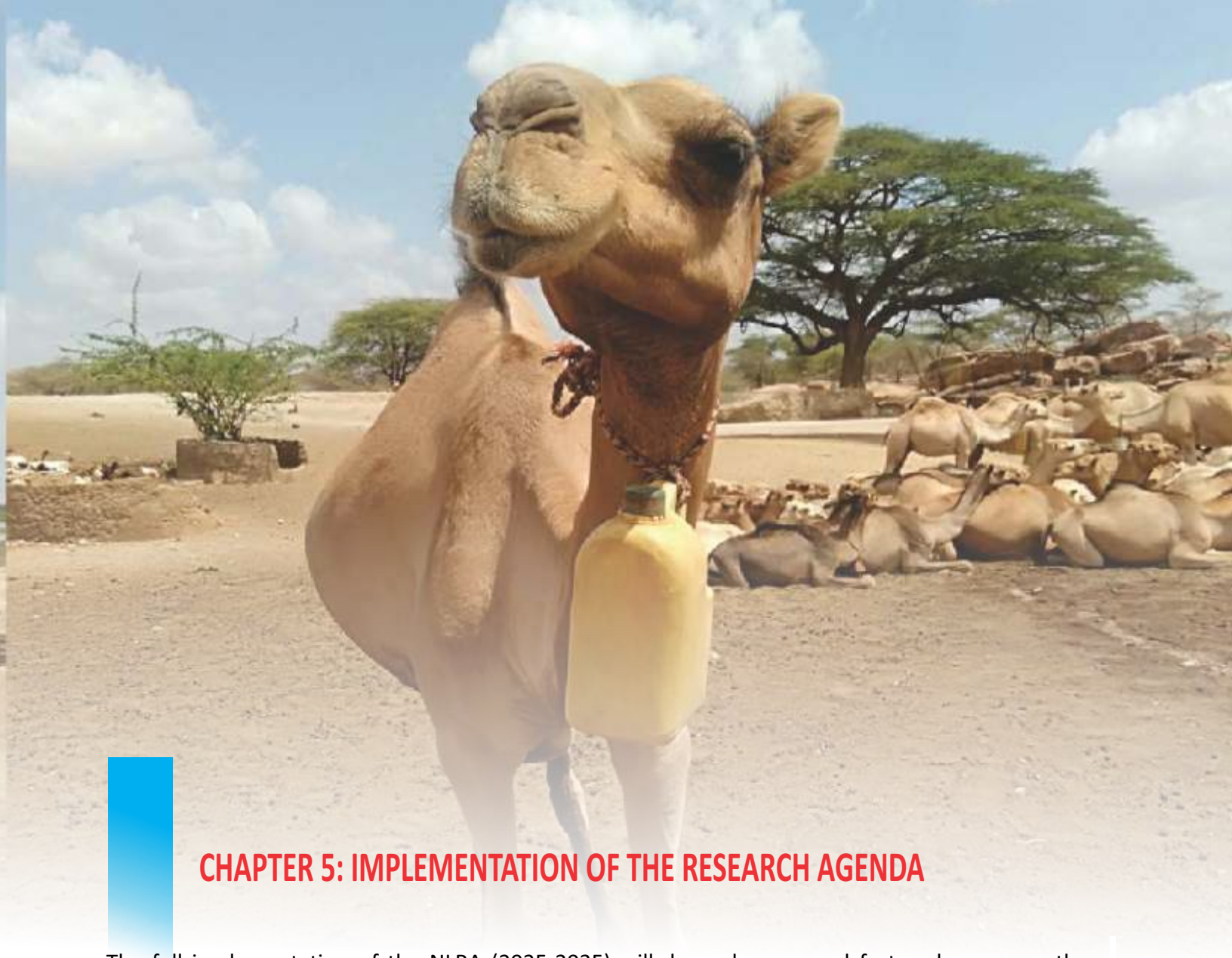
- Development, validation, and dissemination of context-specific TIMPs that are accessible, affordable, and scalable for smallholder farmers.
- Promoting TIMPs that enhance productivity while ensuring environmental sustainability
- Explore the potential of digital tools such as mobile apps for disease surveillance, e-commerce platforms for market access, and blockchain-enabled traceability systems to improve transparency across the value chain.
- Analysis of available TIMPs
- TIMPs for production, processing, storage, ease retrieval and dissemination
- Developing and validating cost-effective, field-deployable diagnostics for endemic livestock diseases, enabling rapid and accurate identification of infected animals and facilitating timely interventions to minimize economic losses
- Exploring the application of reproductive biotechnologies, such as artificial insemination and embryo transfer, to accelerate genetic improvement and enhance the productivity of smallholder livestock systems
- TIMPs adoption and commercialization
- Outreach methodologies and approaches
- Generation of improved animals breeds, vaccines, using biotechnology

4.9.5 Capacity building

The successful implementation of the NLRA 2025-2035 will depend on a robust human and financial resource base. Currently, the public service, including National Agricultural Research Systems (NARS) involved in livestock research, faces significant challenges due to staff attrition, limited career advancement opportunities, inadequate remuneration, and insufficient learning and development prospects. This situation is compounded by the deterioration of physical facilities and research infrastructure, leading to biosecurity risks and compromised research quality. While addressing challenges related to staff attrition and infrastructure within research systems is crucial, the capacity-building agenda must extend to livestock farmers, pastoralists, traders, processors, and extension service providers. Equipping these stakeholders with the knowledge, skills, and resources they need to adopt improved technologies, sustainable practices, and market-oriented strategies is essential for driving inclusive and equitable growth across the livestock sector. This requires a holistic approach that addresses diverse needs and promotes collaborative learning and innovation throughout the value chain. The livestock research agenda must prioritize participatory approaches to capacity building that empower value chain actors to identify their specific needs and co-create solutions. Furthermore, the capacity-building agenda should foster entrepreneurship and innovation among livestock value chain actors, particularly women and youth and explore innovative financing mechanisms, such as microfinance and crowdfunding, to support the adoption of improved technologies and sustainable practices. By investing in the capacity of all value chain actors, Kenya can unlock the full potential of its livestock sector, creating a more resilient, equitable, and prosperous future for all.

Research Areas

- Capacity gaps and training needs of different livestock value chain actors (farmers, pastoralists, traders, processors, extension officers) based on their roles, agro-ecological zones, and socio-economic contexts.
- extension service delivery models (Research to evaluate the effectiveness of current extension service delivery models and identify innovative approaches)
- Financial literacy & entrepreneurship development (design and test interventions that enhance financial literacy, business management skills, and access to financial services (credit, insurance) for livestock farmers and entrepreneurs)
- Participatory approaches to technology development and dissemination, involving farmers in the identification, testing, and adaptation of livestock technologies and management practices
- Capacity assessment of government agencies, research institutions, and regulatory bodies to effectively support and regulate the livestock sector, and to identify strategies for strengthening institutional frameworks, harmonizing policies, and improving coordination among stakeholders.
- Research funding management
- Human resource capacity needs assessment
- Infrastructure management (equipment, offices, laboratory,
- Accreditation process and evaluation
- Curriculum development and review training
- Emerging technologies in capacity building



CHAPTER 5: IMPLEMENTATION OF THE RESEARCH AGENDA

The full implementation of the NLRA (2025-2035) will depend on several factors key among these being partnerships and collaboration, well-equipped research facilities, sufficient funding to the various NARS, availability of well trained and motivated staff, and favorable political and legal environment.

It is expected that NLRA will be adopted and used across all the NARS and IARCs. The responsibility of ensuring that the NLRA is implemented as envisaged in NARS Policy is vested in the Directorate of Livestock Policy Research & Regulations, State Department for Livestock Development.

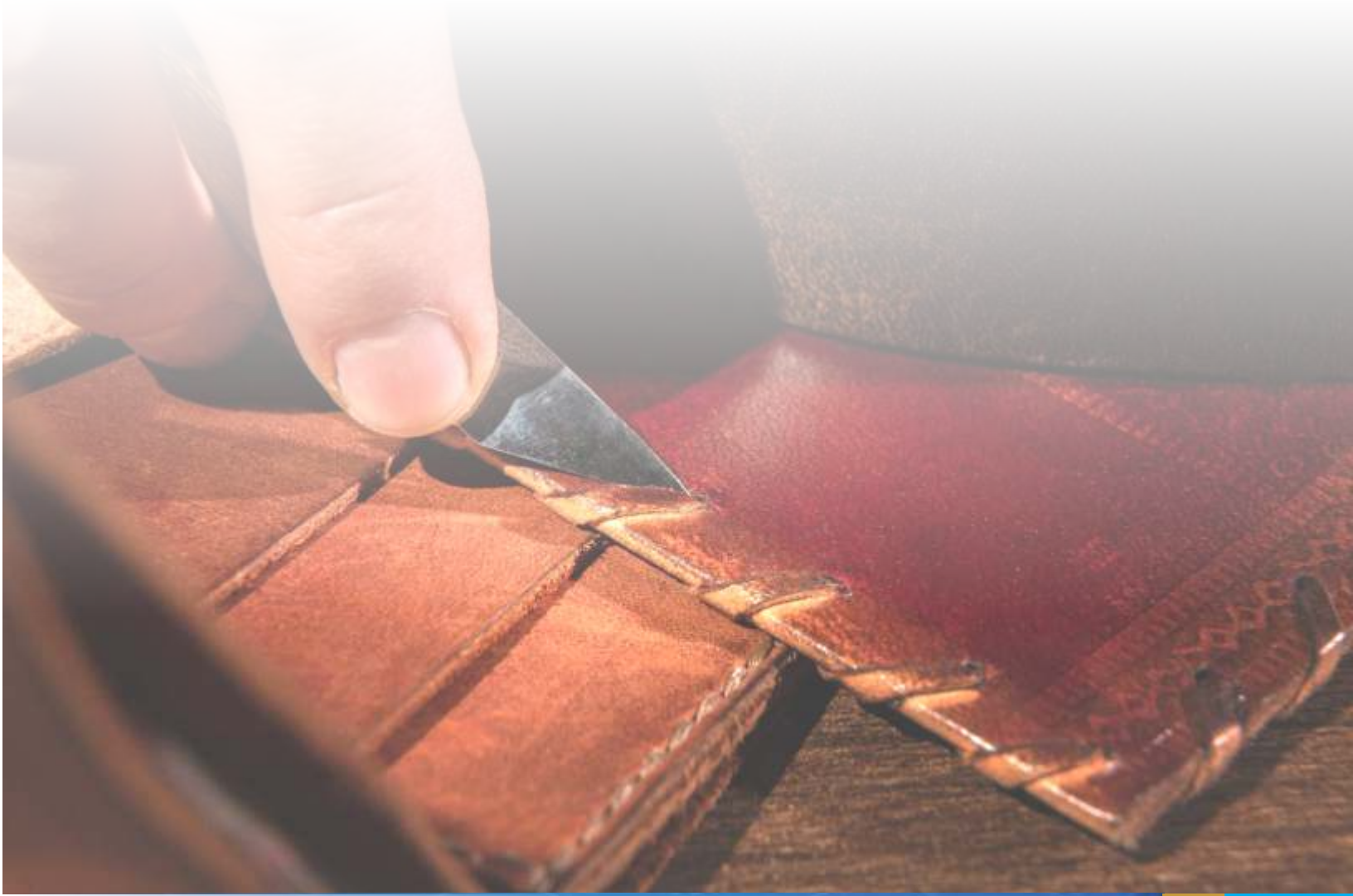
During implementation, stakeholder collaborations and synergy will be enhanced to use the available resources in the identified priority research areas in the priority value chains.

It is recommended that research involving use of animals will be done with approval from an Accredited Institutional Ethics Review Committee.

CHAPTER 6: MONITORING AND EVALUATION

Directorate of Livestock Policy Research & Regulations, State Department for Livestock Development will monitor implementation of the research agenda through periodic evaluations in consultation with all the stakeholders. The directorate will develop a comprehensive tracking framework to ensure the NARS and IARCs implement the prioritized thematic research areas contained in the NLRA in a cost-effective, coordinated and harmonized manner.

The agenda will be subject to biennial review which will provide insights on the gaps and the necessary adjustments and consider any emerging priority research areas. An implementation framework with work plans, for the various research thematic areas will define terms of reference for each of the NARs and IARCs involved in implementing the research agenda. It is anticipated that annual review reports on the implementation of the research agenda will be produced and presented in the relevant stakeholders' forum and to the Cabinet Secretary.



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ANNEXES

ANNEX 1: STAKEHOLDER ANALYSIS

Implementation of livestock research Agenda requires that all relevant stakeholders are involved and well-coordinated. The stakeholders in the livestock research realm comprises policy organs, regulators, funding agencies, implementers, enablers and beneficiaries.

Category	Stakeholders
Policy Institutions	a) National Government
	b) County Governments
Regulators	(a) National Commission for Science, Technology and Innovation
	(b) Other Regulators - These institutions include but are not limited to: Kenya Plant Health Inspectorate Service (KEPHIS), Directorate of Veterinary Services (DVS), National Biosafety Authority (NBA) Directorate of Livestock Production (DLP), Kenya Dairy Board (KDB), Kenya Bureau of Standards (KEBs), Pest Control Products Board (PCPB), National Environmental Management Authority (NEMA) and the Veterinary Medicines Directorate (VMD).
Implementers	Public Research Institutions that undertake Livestock Research a) National Research Institutes that undertake Livestock Research - They include the following. · Kenya Agricultural and Livestock Research Organization (KALRO) · The Kenya Animal Genetic Resources Centre (KAGRC) · Kenya Marine and Fisheries Research Institute (KMFRI) · Kenya Medical Research Institute (KEMRI) · Kenya Industrial Research and Development Institute (KIRDI) · Kenya Institute of Public Policy Research Analysis (KIPPRA) · TEGEMEO Institute of Agricultural Policy and Development · Kenya Veterinary Vaccines Production Institute (KEVEVAPI) · Other Public Research Institutions - These include but are not limited to: National Museums of Kenya (NMK), Kenya Meteorological Department (KMD) and Department of Resource Surveys and Remote Sensing (DRSRS). b) Universities and Tertiary Institutions All private Sector Institutions, NGOs and institutions with research components that undertake Livestock Research

Funding Agencies	These include · National Research Fund, · Agricultural Research Fund, · Development Partners · Other agricultural research supporting agencies
Research Enablers	Enablers are livestock research supporting institutions that undertake activities that directly support research or complement livestock research such as technology uptake, data management, extension or education. These institutions include, but are not limited to: · Kenya Bureau of Standards (KEBs) · Kenya National Innovation Agency (KENIA) · Kenya Industrial Property Institute (KIPI) · Kenya National Bureau of Statistics (KNBS)
Beneficiaries	Beneficiaries of agricultural research outputs including. · Associations/platforms of input suppliers, · producers/farmers, CBOs, Cooperatives · Traders, · Transporters, · Processors, · Professionals · Other livestock value chain actors.

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REPUBLIC OF KENYA

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STATE DEPARTMENT FOR LIVESTOCK DEVELOPMENT

KENYA NATIONAL LIVESTOCK RESEARCH AGENDA

2025-2035