The Role of KALRO in Mainstreaming of the Science Agenda for Agriculture in Africa

Sub-title: Kenya National Action Plan

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Introduction

• Agriculture contributes about 26% directly to the Gross Domestic Product (GDP) and a further 25% indirectly through linkages with agro-based and associated industries.
• Thus the sector is the driver of Kenya’s economy and livelihood for the majority of the population.
• The sector accounts for 65% of the national total exports and provides more than 70% of informal employment in the rural areas.
Overview of KALRO

• The NARS policy led to the enactment of the Kenya Agricultural and Livestock Research (KALR) Act, no 17 of 2013 which established the Kenya Agricultural and Livestock Research Organization (KALRO).

• This led to the merger of the Kenya Agricultural Research Institute (KARI), Kenya Sugar Research Foundation (KESREF), Tea Research Foundation of Kenya (TRFK) and the Coffee Research Foundation (CRF).

• The Organization consists of the Board of Directors in which the management of the organization vests and a Secretariat to implement Board decisions.

• The Act further established 16 research institutes which focus on different thematic research areas.
KALRO’s mandate is to:

- Promote, streamline, co-ordinate and regulate research in crops, livestock, genetic resources, biotechnology and animal diseases
- Expedite equitable access to research information, resources and technologies and promote the application of research findings and developed technologies in the field of agriculture and livestock
- KALRO has 16 Institutes, 51 Centres and Sub-centres strategically located in the country to enable the organization meet the demands of farmers throughout Kenya
KALRO 16 Research Institutes

<table>
<thead>
<tr>
<th>Livestock Research Institutes</th>
<th>Crops Research Institutes</th>
<th>Cross-cutting Research Institutes</th>
</tr>
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<tbody>
<tr>
<td>2. Goats and Sheep</td>
<td>2. Horticulture</td>
<td>2. Genetic Resources</td>
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<td>5. Apiculture</td>
<td>5. Sugar</td>
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<td>6. Veterinary</td>
<td>6. Industrial Crops</td>
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KALRO Research Centres and Institutes

Crop Research Centres
- Food Crops Research Institute
- Horticulture Research Institute
- Industrial Crops Research Institute
- Genetic Resources Research Institute
- Tea Research Institute
- Coffee Research Institute
- Sugar Research Institute
- Agriculture Mechanization Research Institute

Livestock Research Centres
- Apiculture Research Institute
- Biotechnology Research Institute
- Dairy Research Institute
- Beef Research Institute
- Veterinary Research Institute
- Arid & Range Research Institute
- Sheep & Goat Research Institute
- Non Ruminant Research Institute

Crops
Livestock
Counties are mandate of KALRO centres
KALRO’s Strategic Focus

- **Vision** - A globally competitive agricultural and livestock research organization

- **Mission** - To generate and disseminate agriculture & livestock knowledge, innovative technologies and services that responds to clients demands for sustainable livelihoods
KALRO Key Result Areas

- **Result 1:** Technologies and innovations for demand driven crop and livestock products value chains generated and disseminated
- **Result 2:** Knowledge, information and products on demand driven crop and livestock products value chains research collated, stored and shared
- **Result 3:** Policies supporting and facilitating demand driven crop and livestock product value chains developed and advocated
- **Result 4:** Capacity to undertake research on demand driven crop and livestock product value chains strengthened
- **Result 5:** Systems for coordination and regulation of demand driven crop and livestock product value chains developed and operationalized
The Role of KALRO in Making Kenya an Engine for Economic Growth

- generating new income opportunities by value added activities
- Increasing output by mechanizing agriculture
- providing a lucrative market
- offering opportunities for women and youth
KALRO 5-year strategy to focus on unblocking constraints at each node of crop and livestock value chains to make them more competitive to improve Kenyan livelihoods.

KALRO Strategic Plan 2016-2020

- Productivity challenges
  - Technology Development
  - Input Suppliers
  - Production
  - Collection / Processing
- Market challenges
  - Distribution
  - Marketing
  - Consumption
National Strategic Focus for the Agricultural Sector Development

- Increasing **agricultural productivity** and incomes, especially for smallholder farmers
- Emphasis on **irrigation** to reduce over-reliance on rain-fed agriculture in the face of limited high potential agricultural land
- Encouraging **diversification** into non-traditional agricultural commodities and value addition to reduce vulnerability (modern agriculture)
- Enhancing the **food security** and reduction in the number of people suffering from hunger
- Encouraging **private-sector-led development** in the sector
- Ensuring **environmental sustainability**
Crop Research Programme Focus

Thematic Areas
- Crop Improvement and Protection
- Agricultural Mechanization
- Natural Resources Management and Agro-biodiversity
- Socio Economics, Statistics and Policy Development
- Knowledge, Information Management and Outreach

Crop Product Value Chains
Crop Thematic Areas Intervention

- **Crop improvement to increase yields, mitigate climate change with resistance/tolerance to biotic and abiotic stresses and respond to market demands**
- **Develop monitoring and surveillance systems to minimize pest and disease outbreaks, inform policy and develop strategies to address those constraints**
- **Develop seed systems that are suitable and acceptable to all relevant stakeholders**
- **Develop and promote production, pre- and postharvest, and value addition technologies that respond to specialized/niche markets and are environmentally friendly**
- **Develop and/or promote strategies that will contribute to efficiencies in the crop value chains**
Crops Programme Activities

- Number of activities – **187**

- Activities have decreased by **66%** because of withdrawal of World Bank funding (KAPAP)
- 61 varieties released
- 79 varieties evaluated
- 20 varieties in National Performance Trails (NPT) /Adaptability Yield trials (AYT)

**Varieties Developed and Commercialized**

- 17 varieties recommended for release
- 405 varieties submitted to KEPHIS for approval
- 52 advanced tea clones
Seed, Cuttings and Seedlings Availed to Farmers

- 3.1 million cuttings of cassava and sweetpotato
- 120,000 seedlings of fruits and nuts
- 1,377 tons of basic seed
- 1,704 tons of assorted, clean seed
Farmer and Stakeholder Capacity Building

- **15,703** farmers trained
- **2,054** service providers trained as ToTs (trainer of trainers)
- **11,082** trained on good agricultural practices (GAPs)
- **109** stakeholders trained on coffee

- **80 researchers** trained on demand driven research
- **Coffee College** upgraded to accommodate 87 (single occupancy)
- **Horticulture Practical Training Centre** – 5 curricula developed for GAPs
15 natural resources management and agronomic packages developed
31,756 soil samples analyzed and recommendations made

Natural Resources Management

- 2 NRM results published book and book chapter including:
- Adapting African Agriculture to Climate change
- Soil Atlas of Africa published (chapter)
Achievements (2014/2015)

- 5 crop protection management practices developed
- 3 fruit markets identified and 23 market producer centres established in Kwale for passion fruit
- Seed dresser motorized and hydro-tiller fabricated
- 6 policies; 3 policy briefs and 1 regulation developed
Crop Results – 2014 to 2015

Communication of Results

- 3 books
- 148 journal articles
- 54 brochures
- 35 factsheets
- 197 conference presentations
- 27 book chapters
- 11 magazine articles
Livestock Research
Strategic Research focus for Livestock Improvement

Goal
❖ To contribute to sustainable improvement of livestock productivity and enhanced livelihoods of livestock farmers.

Interventions
❖ Develop and promote knowledge, information and technologies/innovations that enhance livestock productivity, value addition and product development, and facilitating market access.

Key results
❖ Improved livestock productivity by efficient use of resources
❖ Better livelihood to benefit the Kenyan people in terms of enhanced food and nutrition security and employment creation
❖ Sustainable environment
Livestock thematic research areas

Research will be structured around promoting technologies
For 13 livestock VCs analysed and constraints and opportunities identified by key livestock sector stakeholders

1. Dairy component
   - Cow milk, goat milk and camel milk value chains

2. Red meat component
   - Beef, Chevon, Mutton and camel meat value chains

3. White meat component
   - Indigenous poultry, broiler, layer and pork value chains

4. Emerging livestock component
   - Honey bee and wild animals like quails and guinea fowl
Livestock Production Challenges

- Inadequate feeds - quantity and quality
- Diseases and parasites
- Inappropriate breeds and shortage of quality breeding stock
- Fragile environmental conditions in ASALs
  - Susceptible to adverse effects of climate change
- Limited value addition and product development
- Market access and competitiveness
- Lack of compliance to International Quality Standards
Livestock and NRM interactions

Agroecosystem productivity,
- Natural vegetation is the basic livestock resource
- maintaining and improving the vegetation diversity of rangelands

Reducing land degradation,
- land tenure is largely communal,
- unsustainable land use systems - land degradation, deforestation, loss of biodiversity, etc

Improving water management,
- determine stock management; migration patterns
- water harvesting, watering points, targeted irrigation
- minimizing conflict

Mitigating effects of climate change
Pasture and Fodder Development

Hay - Rhodes Grass Produced

*Cenchrus ciliaris* (local ecotype)

Lucerne hay released to farmers

Napier Grass
Long term breeding programme to improve performance of Boran cattle continues

Selection of Boran pedigree bulls and heifers
Maintenance of Sahiwal Cattle for Breeding Research Continues

- Supply of Sahiwal bulls to improve the Local zebu cattle
- Pastoral communities benefitting from the on-going research
- Friesian –Sahiwal crosses for ASAL areas, farmers have benefitted with the crosses
Embryo Transfer Technology Lab Equipped
Dairy Breeds for Milk Production

A breeding process where several embryos are collected (flushed) from one female (the donor) and transferred to another female (the recipient) to complete the gestation.

Achievements:
- Fully equipped laboratory
- Training on-going in collaboration with University of Nairobi Animal Production
KALRO indigenous chicken breeds developed

- Spotted
- Brown
- White
- Naked Neck
## Performance of Improved KALRO Chicken

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Indigenous chicken</th>
<th>Improved KALRO Chicken</th>
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</thead>
<tbody>
<tr>
<td>Duration to Market weight (1.5kg) for males</td>
<td>7-9 months</td>
<td>4 – 5 months</td>
</tr>
<tr>
<td>Age at first egg</td>
<td>7 months</td>
<td>5 months</td>
</tr>
<tr>
<td>Number of eggs per year</td>
<td>80-100</td>
<td>180 – 220</td>
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</table>
Research for improving Camel Production Systems

50,000 camel keeping households, gives an annual "demand" of 128 million litres of milk annually
Livestock Tracking

- The digital ID system uses Radio Frequency Identification (RFID) technology, which is safe, environmentally friendly, and tamper proof to identify individual livestock throughout the country.

- In two years alone, Botswana significantly reduced incidences of cattle thefts by at least 60%.

- The bolus system is a complete departure from the traditional 'hot iron' branding and ear tagging that have little or none deterrent to cattle thieves.

- KALRO plans to initiate partnership with organisations testing the technology aiming at making it affordable and available to livestock farmers.
## Vaccines Developed by KALRO VSRI -Muguga

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Status</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contagious Bovine Pleuro pneumonia (CBPP) T1/44</td>
<td>Being produced by KEVEVAPI</td>
<td>In production since 1978.</td>
</tr>
<tr>
<td>Contagious Caprine Pleuro pneumonia (CCPP) F38</td>
<td>Being produced by KEVEVAPI</td>
<td>In production since 1984.</td>
</tr>
<tr>
<td>Rinderpest</td>
<td>No longer in production</td>
<td>Rinderpest was declared eradicated in the world in May 2011.</td>
</tr>
<tr>
<td>Thermo-stable Newcastle Disease vaccine</td>
<td>Marketed as AVIVAX® by KEVEVAPI</td>
<td>The vaccine originated in Australia.</td>
</tr>
<tr>
<td>East Coast Fever (ECF) – Marikebuni</td>
<td>A small stock is available at Muguga – was marketed as ECFim</td>
<td>Lobbying is going on for support to produce new batches</td>
</tr>
<tr>
<td>Goat pox (PPR)thermostable</td>
<td>Trials conducted in collaboration with KEVEVAPI</td>
<td>Results are promising.</td>
</tr>
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</table>
Climate smart agriculture – KALRO and her partners are developing and promoting crops and livestock with environmental resilience and technologies that improve production and productivity
**Linking with Counties**

– KALRO is re-tooling herself to more effectively engage with the counties using approaches that reach out to provide pertinent agricultural information to assist in transformation of agriculture from subsistence to a market oriented production system.
The Value Chain Link Tree

KALRO links
County
selected
priority
value chains

Producers
(Farmers)

Transporters
(Businessmen)

Processors
(large and small-scale)

Crops & Livestock
GOK; KALRO,
Universities,
Policy, Breeding,
Linkage and
Information

Consumers
(You and Me)

Retailers
(Shop Owners)
Empowering Communities for food and nutrition security

- Use of locally produced food crops to make healthy meals

Gadam sorghum and bean meal Narok community capacity building training
Development Research

- Forming stakeholder platforms
- Community production and marketing systems

Free for all

Organize production and marketing

Use of ICT
KALRO will focus on:

- Establish enabling conditions for regional collaboration and cooperation in the technology generation, dissemination and adoption (including capacity development)
- Make sure that there is demand-driven research to generate technologies and provide evidence based research for policy
- Coordinate crops and livestock research using innovation platforms
- Broaden themes for agricultural research
- Develop and strengthen strategic partnerships
KALRO will contribute to:

- Policy formulation
- National and regional research focal point
- Stakeholder consultation
- Vision & capacity building
- Source of information
- Vision & capacity building
KALRO will contribute to:

1. Organizational & human resource development
2. Technology generation & dissemination
3. Promoting cooperation in research
4. Facilitating information sharing
As the market gets sophisticated, so is the need for research and development.

Strategy and levels of engagement

Policy makers
- Providing upstream policy support
- Policy levels

Experts
- Providing knowledge network platforms
- Institutional level

Practitioners
- Facilitating the exchange of development solution
- Grassroots level
Key stakeholders, agric/science initiatives, Instructional framework to drive the S3A at national level
KALRO is deepening her collaboration with various stakeholders that include other relevant Government line ministries, NGOs, FAO, UNEP, IFPRI, FARA, ASARECA and SRO, CGIAR and International Agriculture Research Centers (IARCs) to more effectively undertake cutting-edge research to advance science and knowledge.
S3A Advocacy (Communications) at national level.

• Various relevant Government line ministries that include:
  • the Treasury Planning and Finance
  • Attorney General
  • Ministry of Agriculture Livestock and Fisheries
  • NGOs
  • CGIAR
  • IARC
Channels of Communication

- Journals
- Books
- Technical notes
- Brochures
- Fact sheets
- Posters
- Annual reports
- Farmer magazines
- Policy briefs
National Consultation

• 01-15 th May 2017
What further support would you expect from CCARDESA/FARA?

• Logistical support
• Technical support
• Training and human capacity building
• Funding/Financing
• Institutional support
Date to submit the Action-Plan Template

• 15th May 2017
Thank You for Listening

Research continues to greater heights