



ACP Science  
and Technology II Programme



*Demonstration on how to perform artificial insemination of goats at Egerton University, Njoro, Kenya (February 2015).*

# iLINOVA — Strengthening capacity for participatory management of indigenous livestock to foster agricultural innovation in Eastern, Southern and Western Africa

## SUMMARY OF RESULTS

Technical liaison desks were set up to facilitate and institutionalise university-industry-civil society links. A mobile application system to enhance information access on livestock production and management was developed. The multipurpose centre at Egerton University was renovated – renamed to Centre of Excellence for Livestock Innovation and Business, CoELIB – and hosts recording, meeting, laboratory and office spaces, as well as the African Academy of Dairy Sciences. The Centre acts as a think tank (for business information, technology, innovation, markets and entrepreneurship); provides links to access finances, business ideas, risk insurance, loans and markets; incubates business ideas and innovations; and provides business start-up advice, mentorship and guidance in the livestock value chain. A memorandum of understanding with the African Agribusiness Incubation Network enables CoELIB to be one of the region's incubation centres.

## BACKGROUND

Use of indigenous livestock products is on the rise due to increased indigenous livestock population. Most of this livestock in Kenya, Malawi and Nigeria, however, are kept under low input systems and stakeholders along the livestock value chain remain food, nutrition and income insecure, and hence, perennially in poverty.

Policies developed in relation to management of indigenous livestock are not based on scientific evidence. The focus of academic programmes on science, technology and innovation has been so limited that young scientists trained in these programmes are not adequately equipped with qualifications and skills to promote innovation and develop appropriate technologies. Consequently, the capacity of scientists in Africa to successfully execute high through-put scientific technologies and innovations are limited and need to be enhanced through both training and development of institutional and structural capacities.

The general opinion among producers is that indigenous livestock have low performance. This perception is potentially hampering efficient utilisation of scientific technologies and innovation, and thus needs to be

altered and indigenous livestock potential appreciated. Indigenous livestock form an important repository of genetic diversity which could be improved using innovative technologies. Existing examples include the high producing beef breed 'Boran' which has been developed through efficient livestock management.

The project focussed on poverty reduction, food and nutrition security, growth and socio-economic development of stakeholders involved in indigenous livestock management (chicken, cattle, goats, rabbits, pigs, etc.) in Eastern, Southern and Western Africa. It enhanced the capacity of stakeholders along the livestock value chain to foster agricultural competitiveness and innovation in indigenous livestock production systems. These stakeholders include: scientific and teaching staff; undergraduate and postgraduate students; entrepreneurs and enterprises benefiting from knowledge on management of indigenous livestock; potential innovators; and other private and public actors in the agricultural sector benefiting from scientific technologies and innovations related to indigenous livestock management and policy recommendations.

### PROJECT IMPLEMENTATION PERIOD

January 2014 - June 2017

### CONSORTIUM

- Egerton University, Kenya
- Lilongwe University of Agriculture and Natural Resources (LUANAR), Malawi
- Obafemi Awolowo University (OAU), Nigeria

### Associated partners:

- Wageningen University and Research, the Netherlands
- Kenya Agricultural and Livestock Research Organisation (KALRO), Kenya
- Ministry of Agriculture, Livestock and Fisheries, Kenya
- International Livestock Research Institute (ILRI), Kenya
- Department of Agricultural Research Services, Malawi
- Department of Animal Health and Livestock Development, Malawi

### PROJECT CONTACT

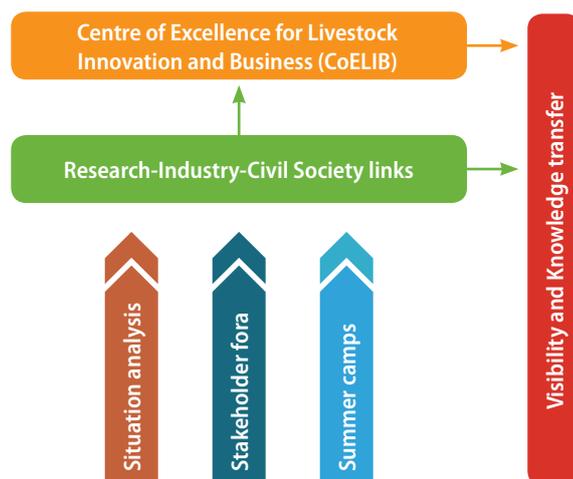
Prof. Alexander K. Kahi  
Faculty of Agriculture  
Egerton University  
Njoro Mau Narok Road 5  
20115 Egerton  
Kenya  
Tel: +254-72-785.0007  
a.kahi@coelib.org

### PROJECT WEBSITE

[www.ilinova.coelib.org](http://www.ilinova.coelib.org)



## METHODOLOGY



### Situation analysis

Field surveys and interviews were held in Bunda (Malawi), Nyahururu and Njoro (Kenya) to determine the utilisation of existing scientific technologies (e.g., reproductive, feeding, breeding and animal health management technologies) by livestock industry players (farmers, producers, processors, business community) to manage their livestock, especially indigenous types. The extent to which they applied innovative features and entrepreneurship was assessed, as well as the gender roles in livestock management, product marketing, and other cross-cutting issues that influence livestock production.

### Stakeholder fora

Local and international fora were held to exchange information between producers, producer groups, processors, lecturers and students from Higher Education Institutions (HEIs) and researchers on new developments in the livestock industry and emerging production challenges, as well as to share experiences and research outputs.

### Summer camps

During summer camps both scientific (researchers, technologists, lecturers and post-graduate students) and producer communities (producers and producer groups' leaders) were trained in livestock production issues, e.g., genomic selection in livestock, livestock biodiversity conservation, hydroponics fodder production, livestock recording, and rabbit production. The training themes were based on the stakeholder needs determined in the situation analysis.

### Research-industry-civil society links

*Technical liaison desks* were set up in the participating universities to link them with the livestock industry, stimulate industry actors



*Training on artificial insemination of goats at Egerton University, Njoro, Kenya (February 2015).*

to be mentors and offer internships, establish a database of industry players and mentors, and coordinate research projects and university-industry-civil society roundtable sessions. *Science and technology study projects* – action research projects – were carried out to enhance students' problem-solving skills, foster the use of science and technology in livestock management, and provide science-based recommendations to industry problems.

*Science and technology internship programme* enabled students to have hands-on experience in the firms / farms where various industry values were inculcated.

*Mentorship programme*, where students were assigned to mentors (industry technocrats, elite livestock producers and scientists), allowed discussions on general and specific issues, and hands-on experience.

### Multipurpose centre

The multipurpose centre at Egerton University was renovated and renamed to Centre of Excellence for Livestock Innovation and Business, CoELIB. In Nigeria and Malawi, centres were established which served as branches of CoELIB in those countries. CoELIB offers the following products and services:

- *Incubation, business and market development:* Support to students, innovative entrepreneurs

and community members for establishing a new business, growing existing businesses, taking products to market and linking entrepreneurs with market opportunities.

- *Information, technical assistance and consulting:* Promotion of innovative technology, business and market development.
- *Research, development and commercialisation:* Application of knowledge derived from research to address the most pressing problems in society related to the livestock value chain.

CoELIB hosts the African Academy of Dairy Sciences (DairyAcademy) that is further strengthening the capacity of HEIs to deliver competent graduates for enhanced competitiveness in the dairy value chain. CoELIB was registered as a trademark in Kenya and is a member of the African Agribusiness Incubation Network (AAIN) enabling CoELIB to be one of the region's incubation centres.

### Knowledge transfer

Newsletters, conference papers and scientific journal papers were produced. The project also took part in regional exhibitions where technologies and start-ups (established as part of the research-industry-civil society links and at CoELIB) were exhibited.



*Improvised feeding trough, a cheap alternative for livestock keepers in a beef ranch in Laikipia, Kenya (April 2016).*

## RESULTS

### → Outputs

#### Stakeholders

- >900 stakeholders: lecturers and technical staff of the participating universities, researchers from the National Agricultural Research System (NARS; 103, 40% females), graduate students (141, 42% female), livestock producers (659, 23% female), policy makers, civil society organisations and advocacy groups, private and public firms.
- 7 innovation groups incubating their businesses at CoELIB.

#### Capacity building

- 10 MSc and 6 PhD students.
- 6 scientific community summer camps on: genomic selection of livestock, project cycle management and grant proposal writing.
- 6 stakeholder summer camps on: cooperative management, animal recording, feed ration formulation and dairy management.
- 1 mentorship workshop for community members on commercial rabbit management.
- Several technical trainings of students, university staff and community members on livestock technologies.
- 5 entrepreneurship trainings to business incubatees.

#### Networking

- 9 roundtable training sessions to foster university-industry-civil society links through partnerships and collaborations.

#### Facilities

- Centre of Excellence for Livestock Innovation and Business, CoELIB ([www.coelib.org](http://www.coelib.org)).
- 2 branches of CoELIB at LUANAR and OAU.
- 1 poultry unit renovated at OAU.
- 3 technical liaison desks in the participating universities.

#### Technologies

- Several audio and video programmes on technologies in the livestock industry available on YouTube (CoELIB-Egerton).
- A mobile application system that helps link researchers, farmers, input providers and the market.
- A protocol for the use of artificial vaginas for rabbits (OLIRAV).

#### Business start-ups (see: [www.incubar.coelib.org](http://www.incubar.coelib.org))

- M-FUGO, a SMS-based marketing and information system for the different actors



Vaccination against foot and mouth disease in a pastoralist community in Mau Narok, Kenya (April 2016).

- in the Indigenous Chicken Production Value Chain.
- Token, an online platform linking farmers to research organisations.
- Ukulima Frontline, a platform providing timely, relevant and reliable agricultural information by different actors along the agricultural value chain.
- Prima Gallus, a 3-point business model focusing on value addition in chicken products, and also a mentorship programme targeting young entrepreneurs.
- Mazao Miller, a producer of quality animal feeds such as layers mash, growers mash, chick mash and dairy meal among others for domesticated animals.

#### Visibility

- 6 newsletter issues.
- Flyers, brochures and leaflets.
- 1 regional conference on sustainable improvement of indigenous chicken productivity.
- 6 dissemination symposia (LUANAR, 3; OAU, 3).
- 1 international congress on livestock innovations and development.
- 1 radio programme on Egerton FM radio.
- CoELIB TV, an online TV station that produces and broadcasts agricultural programmes for farmers and other stakeholders.

#### Publications

25 papers in refereed journals; examples:

- Miyumo S. *et al.*, 2018. Genetic and phenotypic parameters for feed efficiency in indigenous chicken in Kenya. *Livestock Science* 207, 91-97.
- Popoola M.A. and Oseni S.O., 2018. Multifactorial discriminant analysis of cephalic morphology of indigenous breeds of rams in Nigeria. *Slovak Journal of Animal Science*, 51(2): 45-51.
- Adeyemi M. and Oseni S.O., 2018. Canonical discriminant analysis of biometric data

of Nigerian indigenous turkeys. *Archivos de Zootecnia*, 67(257): 7-12.

- Khobondo J.O. *et al.*, 2017. Genetic and non-genetic sources of variation in natural antibodies titre values among indigenous chicken. *American Journal of Research Communication*, 5(7), 31-45.
- Oseni S.O. *et al.*, 2017. Nigerian West African Dwarf Goats. In: Simões J., Gutiérrez C. (eds.), Sustainable goat production in adverse environments: Volume II. Springer, Cham, pp 91-110.
- Miyumo S. *et al.*, 2016. Non-genetic sources of variation and temporal variability in growth and feed efficiency traits among phylogenetically distinct clusters of indigenous chicken in Kenya. *Tropical Animal Health and Production*, 48 (8): 1569-1575.
- Khobondo J.O. *et al.*, 2016. Variation and repeatability of natural antibodies against keyhole limpet hemocyanin of indigenous chicken of Kenya. *Genomics and Applied Biology*, 7(4): 1-8,
- Mwangi S. *et al.*, 2016. Assessment of the genetic variability using pedigree analysis of the Sahiwal breed in Kenya. *Animal Genetic Resources* 59: 7-14.
- Gakige J.K. *et al.*, 2016. Performance of scavenging indigenous chicken ecotypes on targeted phase supplementary feeding. *Livestock Research for Rural Development*, 28, 4.
- Kahi, A.K. and Miyumo S., 2016. Hydroponic fodder technology – the potential and challenges. *Resilience Focus* 3, 46-49.
- Khobondo J.O. *et al.*, 2015. The effects of dietary probiotics on natural IgM antibody titres of Kenyan indigenous chicken. *Livestock Research for Rural Development*. Volume 27, Article #230.
- Makinde O.A. and Egbekun C.P., 2016. Determination of optimum dietary energy and protein levels for confined early-stage Fulani Ecotype chickens. *Livestock Research for Rural Development*. Volume 28, Article #164.



Nyama World employees sorting out dried meat to be packed in different weight sizes ready for the market in Lilongwe, Malawi (March 2017).

## RESULTS

### Outcomes

- Livestock producers interested in applying useful scientific technologies and innovations.
- University scientific staff are more equipped in participatory and action research methods and appreciate the interaction with the industry and resulting benefits.
- Researchers are able to produce scientific outputs that feed into the needs of the industry.
- Students have gained experience in the industry environment, i.e., the necessary skillsets required for them to enter industry without the need for retraining.
- Increased interest from stakeholders (livestock producers, extension agents, and the processing and manufacturing industry) in seeking information from the participating universities.
- Strengthened liaison offices at the participating universities that foster links and collaboration with other institutions across Africa.

### Impacts

#### Usage

- Enterprises (smallholder farmers, processors, traders, cooperatives, extension services) have adopted scientific technologies (e.g., product value addition such as yoghurt making) and innovations (e.g. use of mobile applications in accessing extension and marketing information) along the livestock product value chains.
- Enhanced application of livestock production technologies on farms (e.g., pastured poultry farming, artificial insemination of chickens, animal recording, selective breeding, hydroponic pasture farming, and improved feed formulation techniques).
- Improved productivity on farms achieved through trained extension agents that are actively helping farmers adopt better methods and techniques (e.g., pastured poultry rearing), and helping them link with the local markets.
- Innovative ideas developed by producers, such as the Maggot House rearing maggots to be used as alternative protein sources during feed formulation.
- Training students and farmers on artificial

insemination of chickens and other emerging approaches in effective livestock management.

- Increased engagement between the industry and researchers leading to more responsive research activities.
- Graduates acting as problem solvers to develop action-oriented research that solves farmers' challenges.
- More producers engaging in knowledge and technology-based livestock production and marketing.

#### Policy implications

- The participating universities have incorporated programmes such as industry links, mentorship and internship into their curricula.

#### Sustainability

- The livestock production efficiency has been enhanced, e.g., the producers' production and incomes are more predictable through utilisation of standardised procedures in the production of their livestock.

- The created networks and linkages between universities and industry continue with co-supervision of students and information sharing with industries, thus creating vibrant productive engagement that is resulting in responsive research and curricula offered at the universities.
- The enhanced environmental awareness of the actors in the livestock value chain is expected to reduce negative environmental impacts of their livestock production.
- The increased interest in the use of scientific technologies and innovations in livestock management has resulted in more industries seeking training in various aspects in livestock production.
- The registration of the multipurpose centre into a trademark 'CoELIB' with activities such as agri-journalism and agribusiness incubation has resulted in increased visibility of the institutions involved, allowed for youth participation in agriculture and stimulated interactions between industry and HEIs.

## TESTIMONIALS



**Mr. A. Akinsola, CEO,  
The Meats Republic,  
Ile-Ife, Nigeria**

“The support and innovative ideas contributed through the project has led to better packaging and improvement in product sales. We were able to develop better packaging methods. We are now better able to offer better quality and safer meat to our consumers. Through these improvements in packaging and safety our sales increased and our customers were more satisfied with our products.”



**Mr. Shaban, an inventor  
that fabricates chicken egg  
incubators from refrigerator  
casings, Bunda, Malawi**

“At first we made our incubators with cartons, but we were unable to hatch anything or control temperatures which resulted in the chicks dying. With ILINOVA we developed an incubator made from fridge casings and hatching rates increased from 20% to 50%. We used to build 1 incubator per month and now we have orders of up to 15 incubators a month.”



**Sophie Miyumo, MSc  
student, Department of  
Animal Sciences, Egerton  
University, Kenya**

“ILINOVA has been key in shaping my academic and professional growth and development through its mentorship programme. Balancing supervision and independence has nurtured me into a confident, independent and valuable contributor to science and society. This programme also enabled me to network, connect and share experiences with scientists from other African countries.”

ACP-EU Co-Operation Programmes in the fields of Higher Education and Science, Technology and Research

<http://www.acp-hestre.eu/>

© ACP Secretariat 2018

Reproduction is authorised provided the source is acknowledged.

This publication has been produced with the assistance of the ACP Secretariat and the European Union. The content of this publication is the sole responsibility of the authors and can in no way be taken to reflect the views of the ACP Secretariat or the European Union.



Implemented by the ACP Secretariat

Financed by the European Union