



# **BecA-ILRI Hub: enhancing agricultural science and technology capacity**

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BecA-ILRI Hub, Nairobi, Kenya

**<http://hub.africabiosciences.org>**

First SSP meeting, NaCRRI, 1<sup>st</sup> July 2010

# Biosciences eastern and central Africa (BecA)

*...aims to employ modern biotechnology to improve agriculture in eastern and central Africa*

- BecA is a relatively new initiative
- Developed within framework of NEPAD/AU African Biosciences Initiative
- Project between ILRI and NEPAD



# Biosciences eastern and central Africa

**Africa Biosciences Initiative:** Creation of four regional networks

1. **BecA** (Biosciences eastern and central Africa) for countries in eastern and central Africa
2. **SANBio** (Southern African Network for Biosciences) for southern African countries
3. **WABNet** (West African Biosciences Network) consisting of ECOWAS countries
4. **NABNet** (North African Biosciences Network) for six countries in North Africa

# Biosciences eastern and central Africa

**BecA** consists of:

1. BecA Hub at ILRI, Nairobi
  - Research platform
  - Research related services
  - Capacity building opportunities
2. BecANet
  - Secretariat at KARI, Nairobi
  - Network of 17 countries in EC Africa and five regional nodes
    - Uganda
    - Ethiopia
    - Rwanda
    - Tanzania
    - Cameroon

# BecANet countries

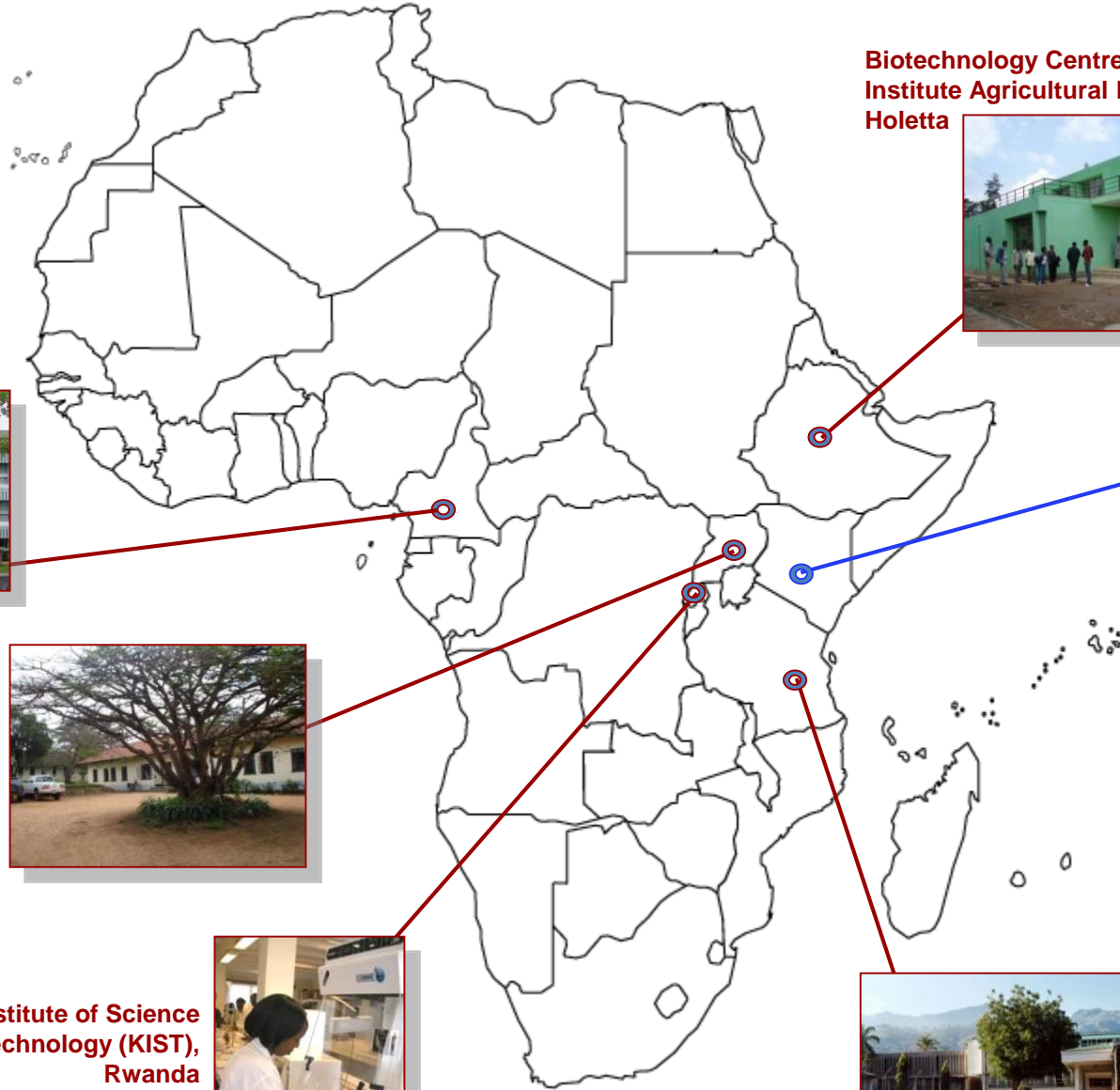


## BecA-Net countries

Burundi, **Cameroon**, CAR, Congo Brazzaville, DRC, Equatorial Guinea, Eritrea, **Ethiopia**, Gabon, Kenya, Madagascar, **Rwanda**, São Tomé and Príncipe, Somalia, Sudan, **Tanzania**, **Uganda**

(Node countries)

# BecA Hub and Nodes



**University of Buea,  
Cameroon**



**Biotechnology Centre, Ethiopian  
Institute Agricultural Research (EIAR),  
Holetta**



**BecA-ILRI Hub, Nairobi**



**National Agricultural  
Biotechnology Centre,  
Kawanda, Uganda**



**Kigali Institute of Science  
and Technology (KIST),  
Rwanda**



**Sokoine University of  
Agriculture (SAU),  
Morogoro, Tanzania**



# What is the BecA-ILRI Hub?

- A focal point for the African scientific community (scientific critical mass and forging of partnerships)
- A Biosciences Centre of Excellence for the region: world-class facilities: labs, equipment and services
- Access to affordable research and capacity building facilities - an open centre for African agricultural improvement activities
- Core scientific and technical competencies in crop, livestock and microbial research

# BecA-ILRI Hub

- Biotechnology laboratories are expensive
- Many different biotechnologies are relevant to agricultural improvement
- Biotechnology is only a complementary part of agricultural improvement efforts (e.g. national program breeders)





2009



syngenta foundation  
for sustainable  
agriculture

2008



2007



2006



2005



2004



2003

Biosciences eastern and central Africa partners

17(+) supported countries:

Universities

NARS

Research Institutions

Nodes:

University of Buea, **Cameroon**

Ethiopian Institute of Agricultural

Research, **Ethiopia**

Sokoine University of

Agriculture,

**Tanzania**

National Agricultural Research

Organization, **Uganda**

Kigali Institute of Technology,

**Rwanda**

agreed for future



Rural Development  
Administration of the  
Republic of Korea



Chinese Academy of  
Tropical Agriculture Science



Before 2008





# 2010



# Laboratory facilities

Seven laboratories (>6000 m<sup>2</sup>)

Central Core services

BecA training lab

Animal health labs, BLS2 and 3 labs, diagnostics

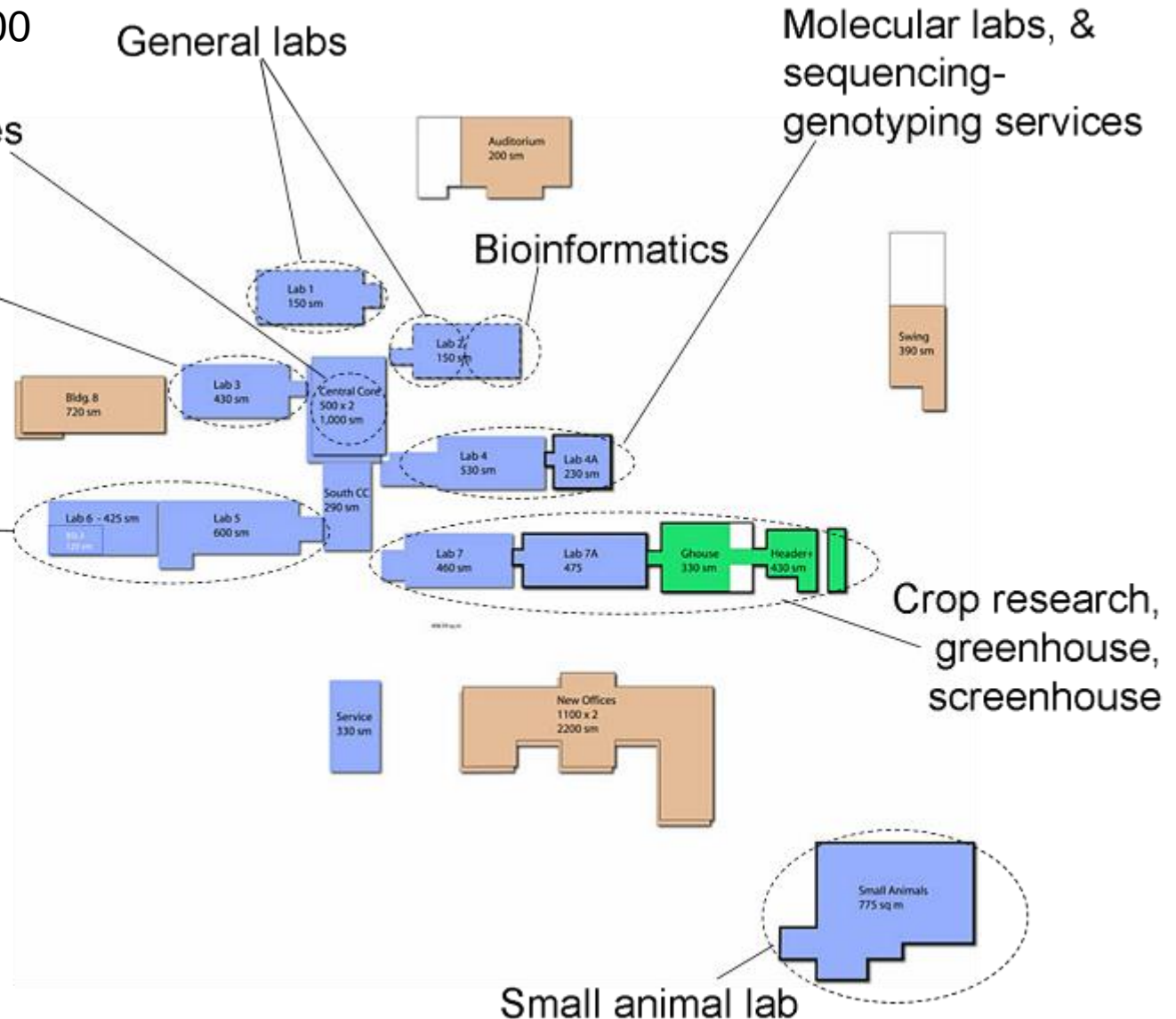
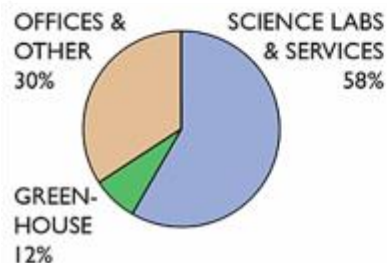
General labs

Molecular labs, & sequencing-genotyping services

Bioinformatics

Crop research, greenhouse, screenhouse

Small animal lab





# BecA-ILRI Hub





# BecA-ILRI Hub



# BecA-ILRI Hub: crop wing





# BecA-ILRI Hub: crop wing





# BecA Hub: Core activities

## **Research**

Agriculture; crop, animal and microbial sciences

## **Capacity building/training**

Training and mentorship of African scientists and graduate students (MSc and PhD)

Short term training

Workshops and courses

## **Research-related services**

SEGOLIP Unit: DNA sequencing, genotyping and oligonucleotides procurement services

Central Core Unit: Media preparation, laboratory waste management and laboratory cleaning

# Core competencies at BecA Hub

- Bioinformatics
- Diagnostics (nucleotide- and protein-based)
- DNA sequencing
- Genetic engineering
- Genomics/Genetics
- RNA silencing/RNAi
- Molecular breeding (marker development/applications)
- Proteomics
- Vaccine technology/  
immunology
- Disease vectors (e.g. tick



# Research examples

**Molecular markers:** marker-assisted breeding and biodiversity surveys in many species

**Diagnostics** for agronomically important diseases

Applications of **genomics** to tracking viral movements and pathogen discovery

Development of **DNA bar code** assay for bush meat surveys

# Crop research student at the Hub: Benard Yada



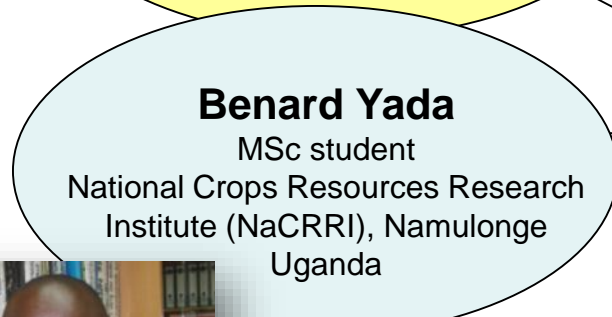
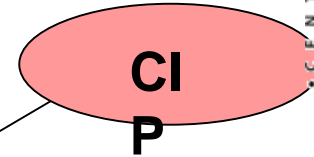
**Bramwell Wanjala**

Research technician,  
KARI Biotechnology  
Center, Nairobi



**Dr. Simon Gichuki**

Scientist, KARI  
Biotechnology Center,  
Nairobi



**Benard Yada**

MSc student  
National Crops Resources Research  
Institute (NaCRRI), Namulonge  
Uganda



biosciences  
eastern and central africa



**Dr DJ Kim**

Scientist, IITA  
Nairobi



Research technicians,  
IITA, Nairobi

**Dr Morag  
Ferguson**

Scientist, IITA, Nairobi

# Hub services: SEGOLIP

## A state of the art genomics platform

- > 2 ABI sequencers (3130, 3730)
- > 1 Roche 454 GS pyrosequencer



## Opportunities linked to the hub's HT genomics platform

- > Large scale genome sequencing (Cassava)
- > Global gene expression profiling (ID new marker

<http://hub.africabiosciences.org>



biosciences

eastern and central africa

**ILRI**

INTERNATIONAL  
LIVESTOCK RESEARCH  
INSTITUTE

# Crop Research: Benard Yada

## Ugandan sweet potato breeder



### Objective

***To characterize sweet potato germplasm from Uganda for conservation and use in breeding programs***

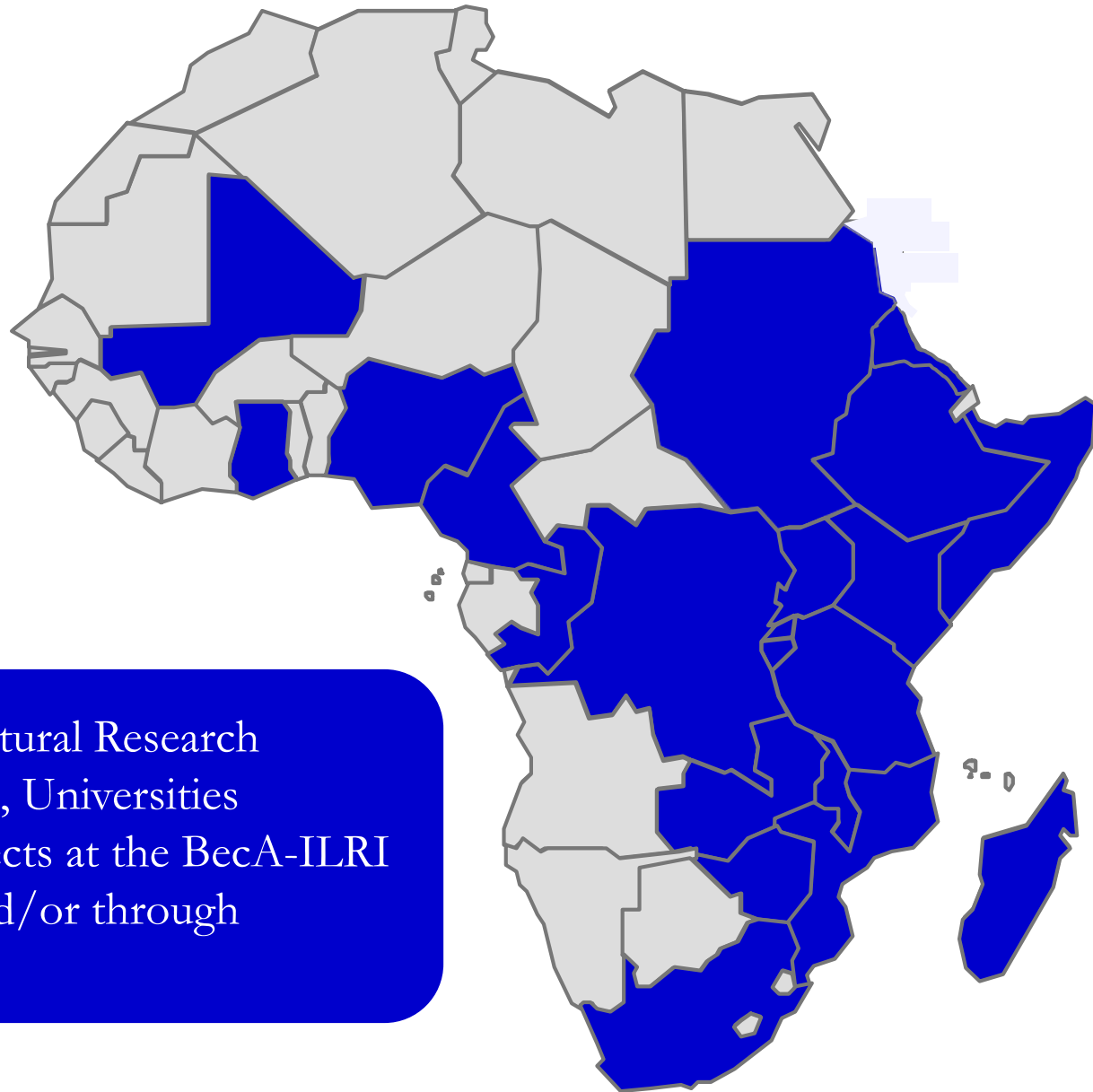
Used agro-morphological and molecular approaches

- *germplasm collection (1303 accessions)*
- *scoring agro-morphological traits*
- *yield and disease susceptibility trials (3 sites; 3 seasons)*
- *genotyping of 192 selected accessions (at Hub)*

### Findings

*High diversity of sweet potato germplasm in Uganda*

**Yada et al. (2010)** Characterization of Ugandan Sweetpotato Germplasm Using Fluorescent Labeled Simple Sequence Repeat Markers



National Agricultural Research  
Systems (NARS), Universities  
involved in projects at the BecA-ILRI  
Hub (directly and/or through  
collaborations)

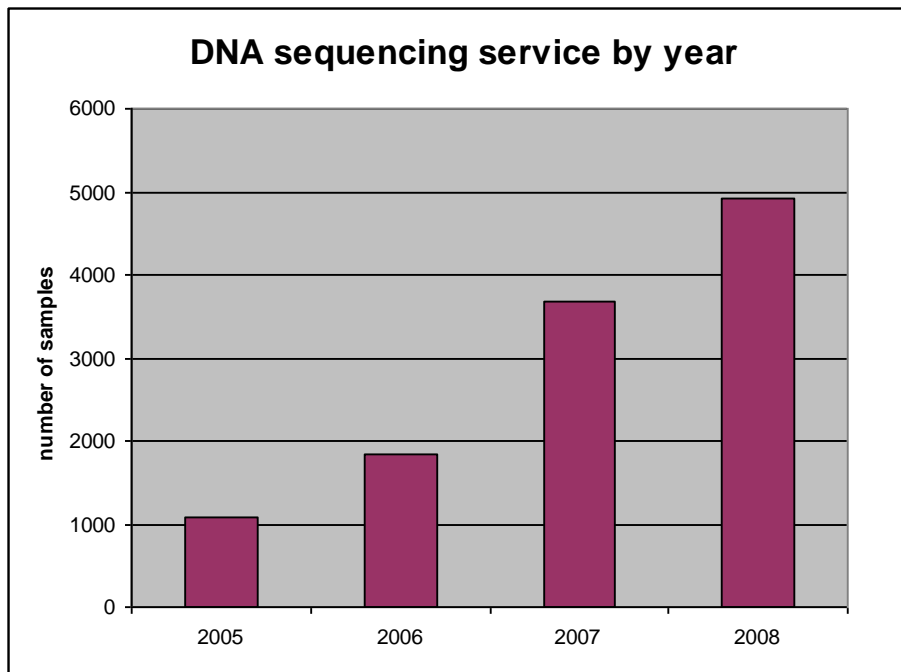


# Hub services: Segolip

**DNA sequencing**

**Genotyping**

**Oligo synthesis/consolidated purchases**



# BecA-ILRI Hub

BecA Hub is located at and managed by ILRI, Nairobi

Canadian International Development Agency (CIDA) support:

- Consultation (2003/2004)
- Design phase
- Upgrade project
  - Renovate existing labs
  - Construct new facilities
  - Install new equipment
  - Completion 2010
- Hub operations from 2007

# BecA-ILRI Hub

