

New breeding direction for African breeding program through the Biosciences eastern and central Africa – International Livestock Research Institute Hub



Nasser Yao

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

<http://www.ilri.org/>

General annual meeting (October, 7-10, 2014)

biosciences

eastern and central africa



ILRI
INTERNATIONAL
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INSTITUTE



Opinion: The Planet Needs More Plant Scientists

Academia is not producing sufficient PhDs in the plant sciences to solve the crop production challenges facing a rapidly growing population.

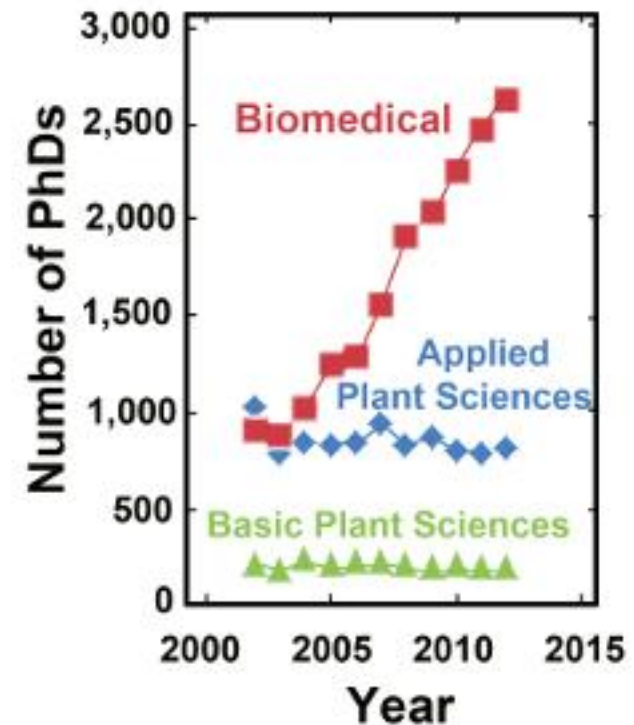
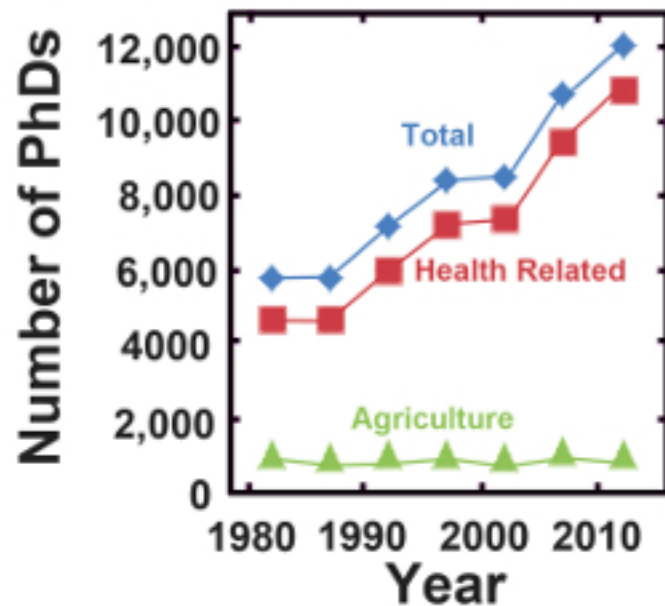
By Alan M. Jones | October 1, 2014

TheScientist

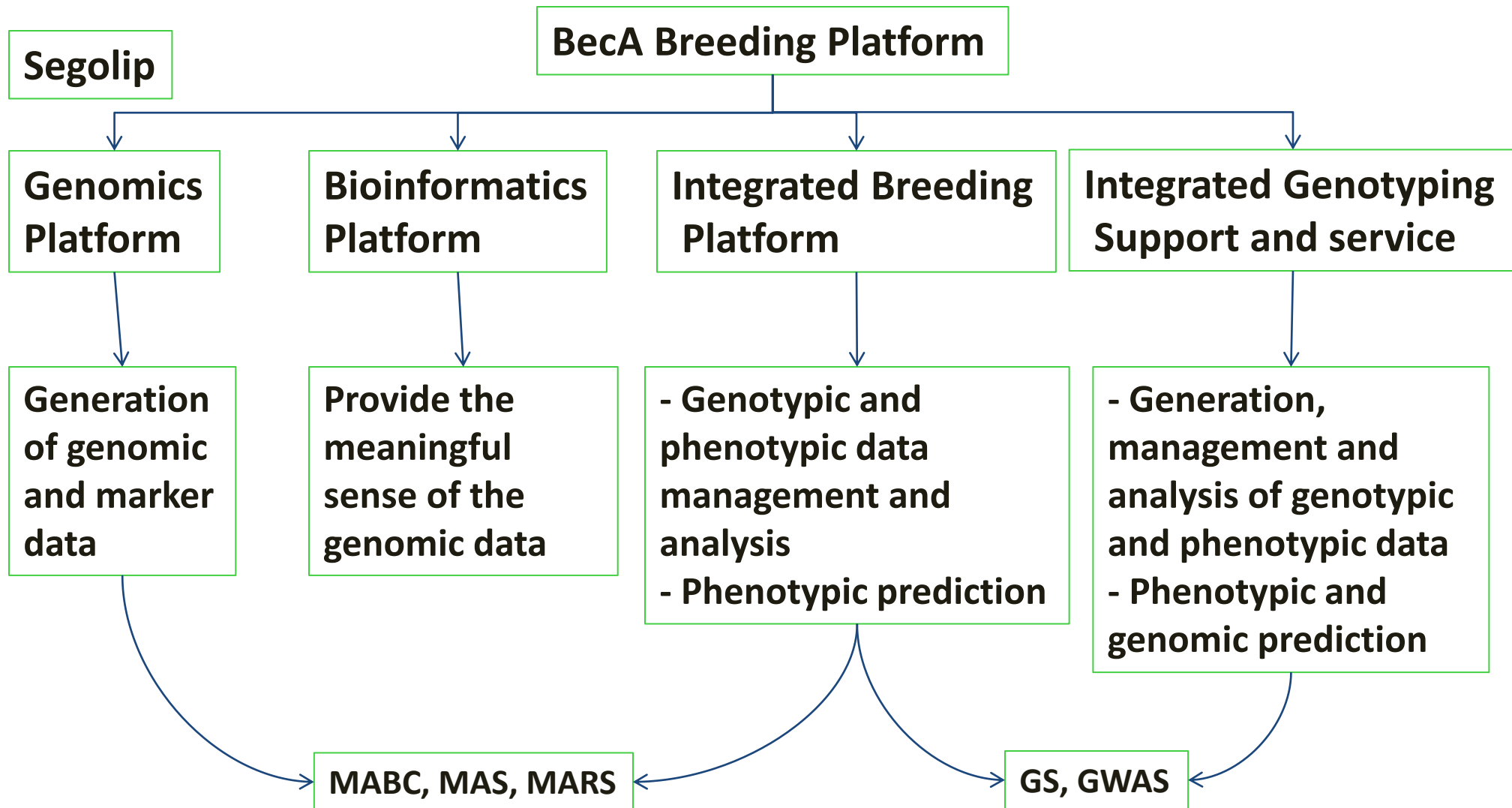
EXPLORING LIFE, INSPIRING INNOVATION

No Growth in the Plant Sciences

Growth of the Life Sciences



The BecA Breeding Platform (BBP): Organigram



Genomics platform

Capillary sequencing

ABI 3130-xl



ABI 3730-xl



ABI 3500-xl



Applications

1. Cassava re-sequencing
2. Viral genomics
3. Metagenomics
4. Disease surveillance
5. Diagnostics
6. **Genotyping**

Next generation sequencing

*454 GS
pyrosequencer*



Illumina MiSeq



Illumina HiSeq 2500



Bioinformatics platform

❑ Linux cluster

- 32 CPUs (AMD 64-bit)
- 128 Gigabyte RAM
- >10 terabytes disk storage

❑ Grid computing

❑ High-performance computing server:

- 128 total processing cores
- 384 GB of memory (RAM)
- 32 TB of disk space

❑ Parallel applications:

- **Genome assembly** (Newbler, MIRA, Celera, velvet, CAP3. ...)
- **Genome annotation** (glimmer, ...)
- **Phylogenetic analysis** (Beast, Mr Bayes)
- **Other sequence analysis tools** (BLAST, clustalw, HMMER, R)



The integrated breeding Platform

Main Objective

To provide in a single place most of the tools and services that African breeders use in their day to day breeding activities

Target users

- Breeders in the NARS for access and use of the technology
- Small and medium enterprises mainly involved in seed multiplication

The integrated breeding Platform

The tool: Breeding Management System which

- Provide access to database
- Development nursery and field book before running nurseries and trials
- Analytical tools and support service
- Genotyping service
- Various tools attractive to breeders: OptiMAS, MBDT

The integrated breeding Platform

The 5 components of the BMS

▼ BREEDING ACTIVITIES

Manage Lists

Make Crosses

Manage Nurseries

Manage Trials

▼ INFORMATION MANAGEMENT

Import Germplasm

Manage Genotyping Data

Browse Studies

Head to Head Query

Adapted Germplasm Query

Manage Ontologies

▼ STATISTICAL ANALYSIS

Single-Site Analysis

Multi-Site Analysis

Multi-Year Multi-Site Analysis

Breeding View Standalone for QTL

▼ MARKER-ASSISTED BREEDING

Molecular Breeding Design Tool

Molecular Breeding Decision Tool: OptiMAS

Molecular Breeding Planner

▼ PROGRAM ADMINISTRATION

Program Members

Program Locations

Program Methods

Backup Program

Restore from Backup File

Update Program

Delete Program

Manage User-Added Tools

Data Import Tool

Software License

Molecular breeding platform: The team

Yao Nasser

Ivory Coast

- IBP Breeding facilitator
- Plant breeding academy



Mary Wambugu

Kenya

- IBP Technical Support Coordinator



Marc Wamalwa
Bio-informatician



Francesca Stomeo
Genomics

Alex Bombom

Uganda

- Wide crosses (maize x sorghum)
- Phenotyping



Thank you

