



**MAKERERE UNIVERSITY**



# Regional MSc and PhD in Plant Breeding

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# Background

- Plant breeding is one areas with potential to revolutionized agriculture in Sub-Saharan Africa
  - Limited number of plant breeders in the region
- RUFORUM and partners universities proposed and setup regional MSc and PhD programs (Both at Makerere University)
  - To produce high caliber mid-level (MSc) and High level (PhD) scientists as a medium for long term response to plant breeding gaps

# Background

- These Regional programs aims at integrating traditional plant breeding, biotechnology and seed system approaches to increase the rate of developing new varieties and access to improved seed.
- The programs draw expertise to teach the courses from both within and outside the region (Seed companies within Uganda, Scientists from NARO, Private consultants, ACCI, Africa University)

# Background

## Graduate Profile

- A plant breeder with a mix of knowledge and skills beyond just development of crop varieties, and with the innovativeness to meet future breeding challenges and demands. - **Including demand led plant variety design?**

# Background

## Graduate Profile

- Technical competencies
  - Plant breeding, seed systems, plant biotechnology, and research methodology.
- “Nontechnical” competencies:
  - Agri-business, ethical skills and cross-cutting development issues (e.g. gender, etc.)
  - “Nontechnical” are critical for breeders as they interphase with communities in the definition of breeding objectives, during crop variety development and indeed dissemination of the technologies (the varieties). – For PhD one chapter – Breeding objectives

# Curriculum - MSc

- MSc in Plant Breeding and Seed Systems is by course work (First year) and Research (from 2<sup>nd</sup> semester Year 2)
  - Courses cater for technical and non-technical competencies
- **Core courses:**
  - Applied Agricultural Statistics and Biometry
  - Principles of cultivar development
  - Plant Cell and Tissue Culture
  - Practical Plant Breeding Methods
  - Graduate Seminars and research implementation skills
  - Quantitative and Biometrical genetics
  - Bio-policy, Bio-safety, Bio-ethics
  - Seed science and seed systems

# Curriculum - MSc

- **Elective courses:**
  - Utilization of plant genetic resources
  - Plant ecology and evolution
  - Principles of population and evolutionary biology
  - Social research methods
  - Crop agronomy and physiology
  - Agricultural marketing and management
  - Crop pest ecology and management
  - Disease management and epidemiology
  - Environmental Impact Assessment
  - Programme planning and management

4-6 months internship with a seed company is part of MSc training

# Curriculum - PhD

- The Regional PhD in Plant Breeding and Biotechnology (3 years) is by course work (1<sup>st</sup> Year) and research (from 2<sup>nd</sup> semester 1<sup>st</sup> year)
- **Core courses:**
  - Applied Plant Breeding
  - Advanced Molecular Biology and Genetics
  - Applied Agricultural Statistics and Research Methods
  - Advanced Plant Breeding
  - Agricultural and Food marketing
  - Programme Planning and Management
  - Applied Molecular Biology and *In vitro* Techniques



# Curriculum - PhD

- **Elective courses:**
  - Agronomy and Crop physiology
  - Molecular Plant Microbe Interactions
  - Sustainable Seed Systems
  - Personal Development and Social Skills
  - Bioinformatics and Functional Genomics
  - Advanced Insect Pest Management Systems
  - Soil-Plant-Atmosphere relations

# Where are we now?

- Since the launched of these programs have enrolled students from Benin, Burundi, DR Congo, Ethiopia, Ghana, Liberia, Malawi, Mozambique, Nigeria, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Zambia and Zimbabwe among others
- We have graduated about 40 MSc and over 10 PhDs since the launched in 2008
- We currently have over 40 MSc Students at different stages of finishing (including the 1<sup>st</sup> years) and about 20 PhD students at different stages of their studies

# Where are we now?

- A few course modules have been developed for the PhD
- MSc modules are being developed with collaboration from US Universities
- We have just started the process of curriculum review (good timing?)
- It often take about five years before a curriculum review

# Challenges

- Human resources to teach and supervise the students
- Logistics constraints to bring in external resource persons for the PhD program (No funding at the moment)
- MSc has funding from AGRA

THANK !!