

# **MAKERERE UNIVERSITY**

## **63<sup>rd</sup> GRADUATION BOOKLET**

**The Principal, College of Agricultural and Environmental Sciences to present the following for the**

**Conferment of the Degree of Doctor of Philosophy (Agriculture)**

**ATUKWASE Abel**

**“Fusarium and fumonisin contamination of maize produced in Uganda”**

Mr. Atukwase’s research focused on contamination of maize with *Fusarium* species and fumonisins. The findings indicated that majority of maize samples obtained from 3 major maize producing agroecological zones were infested with *F. verticillioides* and *F. proliferatum* that are known to be the major producers of fumonisins; a mycotoxin that is associated with esophageal cancer among maize consuming populations. The fumonisin levels in majority of the maize samples were above the UNBS recommended levels of 5 mg/kg. Majority of *F. verticillioides* and *F. proliferatum* strains isolated from maize were high fumonisin producers. The study concluded that the maize consuming population in Uganda could be exposed to high levels of fumonisins. Crop rotation, timely harvesting, drying on raised structures and proper storage were some of the practices that were found to reduce contamination of maize with fumonisins. The research was funded by NORAD and Carnegie Co-operation of New York and supervised by Prof. A.N Kaaya and Prof. Charles Muyanja.

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**MFITUMUKIZA David**

**“Spatial and Seasonal Dynamics of Rangeland Herbage: An Integration of Proxy and Direct Monitoring Approaches”**

Mr. Mfitumukiza investigated the applicability of medium and high resolution satellite images in assessing, monitoring and predicting rangeland forage quantity and quality in south western Uganda. His research was motivated by the need for an alternative approach to quadrat harvesting based approach of herbage assessment and monitoring which is known to be limited to small area coverage, time consuming, destructive and expensive. He demonstrated that herbage quantity and quality can be assessed using herbage cover and species composition respectively as proxy measurements. A model for predicting seasonal herbage yield and its spatial distribution was developed. The thesis documented reliable methods and information useful for establishing rangeland monitoring protocols and stocking capacities. The supervisors were Dr. D. Mpairwe, Prof. M.T. Tenywa and Prof. Sandy S. Tickodri-Togboa. The study was funded by Rockefeller Foundation, DAAD and International Foundation for Science.

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**MIIRO Richard**

### **“Enhancing the performance of farmers’ marketing organizations by improving training application”**

Mr. Miiró researched on why thousands of smallholder farmers’ marketing organizations are not performing well despite the extensive training investments. Among the key explanations for this is the failure by trainees to apply training back to the farmers’ organization’s work setting. The study results reveal that applying training depends on trainees’ capacity, members’ collective participation in planning for the training, training methods that focus on applying training back to work, supervisors’ support, availability of resources, and the quality of mentoring from business partners of the farmers’ organizations. The study was supervised by Dr. Frank Matsiko, School of Agricultural Sciences, Makerere University and Professor Robert Mazur, Iowa State University. Financial support was received from USAID’s Agricultural Productivity Enhancement Program; The Norman E. Borlaug Leadership Enhancement in Agriculture Program; SIDA/SAREC; Iowa State University and Makerere University.

### **Conferment of the Degree of Doctor of Philosophy (Agriculture)**

MUKWAYA Paul Isolo

### **“Reducing the Carbon footprint from transportation in growing cities: Application of city planning approaches in Kampala city, Uganda”**

Mr. Mukwaya investigated the carbon footprint of transportation and how city planning approaches could be used to reduce it in Kampala City. Using data from a travel survey integrated with key informant interviews, results indicated that the transport landscape in Kampala is not a product of a grand master plan or design framework but a product of thousands of decisions made by several individuals and government agencies. Scenarios analyses showed that the employment creation scenario generated the highest potential to reduce CO<sub>2</sub> emissions from transportation in the city. Available planning institutions indicate that their existence is built on fiscal reasons with little consideration for environmental problems. For Kampala City to adopt a low carbon path from transport there is a need to increase the number of jobs generated in sub-centres and this should be reinforced by measures that improve road infrastructure and public transportation in the city. The study was supervised by Associate Professor Hannington Sengendo, Professor J.B. Nyakaana, and Professor Tom Oti of Makerere University.

### **Conferment of the Degree of Doctor of Philosophy (Agriculture)**

NABANYUMYA Robert

### **“Seed production, germination, seedling growth and domestication potential of *Afrocarpus usambarensis* var. *dawei* and *Podocarpus milanjanus* in Sango Bay, Uganda”**

Mr. Nabanyumya investigated the seed production, germination potential, on-farm seedling growth rates and potential for on-farm planting of *A. usambarensis* and *P. milanjanus* which are valuable timber trees both nationally and internationally. These species have been overharvested in Sango bay forests, which was once called a *Podocarpus* dominated forest. The pressure on these trees is so immense and yet there have been no efforts to plant the trees. It was found that *A. usambarensis* produces more seed per tree per year than *P. milanjanus* while *A. usambarensis* seeds germinate better than *P. milanjanus* under the same conditions. When planted on-farm, *A. usambarensis* has better survival and growth rate than *P. milanjanus*. The study has also revealed

that *A.usambarensis* and *P. milanjanus* can both be grown on-farm and germinated under nursery conditions and this will aid production of seedlings for on-farm growing. The study contributes to the promotion of indigenous trees which have hitherto been endangered species in Uganda. This study opens up further research opportunities including assessment of performance of these two species under agroforestry conditions and silvicultural studies to assess the suitability of *A. usambarensis* and *P.milanjanus* for plantation forestry in Uganda. The study was supervised by Prof Joseph Obua and Dr. Susan Balaba Tumwebaze. Professor J.M Kasenene and Dr. Peter Ndemere are also acknowledged for supervising the initial stages of the study. Special appreciation to the Late Dr. W.A. Rogers for the technical and financial support.