AGRA impact series

Improved MSc in Cultivar Development – Stories from beneficiaries

Mwila Chibanda – University of KwaZulu Natal Alumni - From Zambia

My name is Mwila Chibanda. I was a student in the first cohort of the IMCDA plant breeding program at UKZN in 2015, funded by AGRA. My MSc research was to determine the Grain Yield Stability, Genetic Gain and Path Coefficient Analyses in Advanced Soybean (Glycine max (L.) Merr.) Lines. This was implemented at SeedCo in Zambia and Zimbabwe using material from their Soybean breeding program. I did my internship and thesis research at SeedCo.

The genetic gain findings of my study led to a complete overhaul of the soybean breeding program and a reassessment of breeding objectives, choice of parents and selection criteria. After completion of my internship in Harare, under the mentorship of renowned breeders Dr Jacob Tichagwa and Dr Hapson Mushoriwa, I was offered a research associate position on the soybean breeding team at SeedCo to implement the soybean breeding program in Zambia. Prior to my employment, all activities on soybean in Zambia were remotely planned and implemented from Zimbabwe.

Since taking up this role, we (Zambia team) have set up the first ever soybean crossing block, so that Seedco now has a fully-fledged soybean breeding program, creating diversity, developing populations and trials. Our first crosses were made in summer of 2016 and advanced through to F5 generation. Selections were made in April 2020 for advancement to trials. We now make crosses every summer. Besides the soybean program, I also assist the principle wheat breeder with evaluation of wheat and other small grain trials across Zambia

Being exposed to BMS during my MSC studies has been very helpful as Seedco migrated to the use of BMS for all its breeding work in 2017. I was part of the team chosen to pioneer this change and I currently manage data for all our local programs, including the maize breeding program. I have had an opportunity to present and defend varieties to the release commttee of Zambia and successfully had two varieties accepted for release. All these are invaluable experences that would not have been possible without the foundation of the MSc Plant breedng program I receved at UKZN and the AGRA funding to participate in it.

Single plant selections with Dr Mushoriwa (Left) and cross pollination of soybean (middle) during internship and standing in front of soybean trials March 2020 (right) and ready to put smiles on farmers faces.

Ruth on her farm and some of the crops she grows

Ruth Magaleta: University of KwazuluNatal Alumni from Malawi

To start with, it was a privilege to be part of this esteemed program and I shall forever be grateful for the opportunity that I was given.

Before and after graduation, I tried applying for jobs both in the private and public sectors, in Malawi but I was not considered, so with all the knowledge and lessons that I acquired through the IMCDA program, I set up a farm. Through my internship with Proseed, I learnt a lot about horticultural crops, seed multiplication and production, so much so that I produce horticultural crops like tomatoes, carrots, lettuce, cabbage just to mention a few and supply at wholesale to retailers. I also produce bananas and maize.

I do the production all year round as I have an irrigation system powered by solar energy. Currently, I am in the process of acquiring more land so that I venture into the seed multiplication business with Dekalb, a seed company here in Malawi. In addition to crop production, I have incorporated animal husbandry, largely pig production, and it has served as a source of manure for crop production hence helping me reduce on production costs.

Lutangu Makweti - University of KwaZulu Natal Alumni from Zambia

My name is Lutangu Makweti and I am currently working for the Zambia Agriculture Research Institute as the National Legumes breeder. I was enrolled in the second cohort of the IMCDA program at UKZN in 2016 and worked on groundnut for my research. My areas of research included screening lines for groundnut rosette virus resistance and adaptability. The research also involved identification of traits in local varieties that needed to be improved by conducting a genotype by trait analysis of 11 landraces.

My internship was done with the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) based in Malawi. As part of my internship, I was attached to a USAID funded project called the Peanut Mycotoxin Innovation Lab (PMIL), which was operational in Malawi and Zambia.

Two groundnut varieties (ICGV SM 01711 and ICGV SM 01514) were recommended for release from my study and these have since been released as MGV 8 (2018) and MGV 9 (2019) respectively. The team I lead initiated the groundnut improvement program for the local varieties that were identified under my MSc research. The team continues to build a robust groundnut breeding program from materials evaluated and or generated from my thesis research. As a team we also released 2 pigeon pea varieties in 2018.

With my internship at ICRISAT, our collaboration (ICRISAT and ZARI) has since improved leading to ICRISAT donating a vehicle to our breeding program to help with mobility. I am currently a Co PI on a groundnut project that looks at enhancing the genetic potential of peanut production in Eastern and Southern Africa funded by USAID which is led by Uganda. Almost 5 tons of basic seed of the newly released variety (MGV 8) has been produced while one ton was produced for MGV 9 and is ready for take up.

I was selected and funded by AGRA through UKZN to make a presentation on my MSc thesis work at the first African Plant Breeders Association Meeting in Accra, Ghana in 2019, which went very well. The exposure was great and enabled me to meet many other scientists and learn a lot.

Lutangu in his groundnut research in the greenhouse and the field

Nokwethaba Biyela - University of KwaZulu-Natal alumni – from South Africa

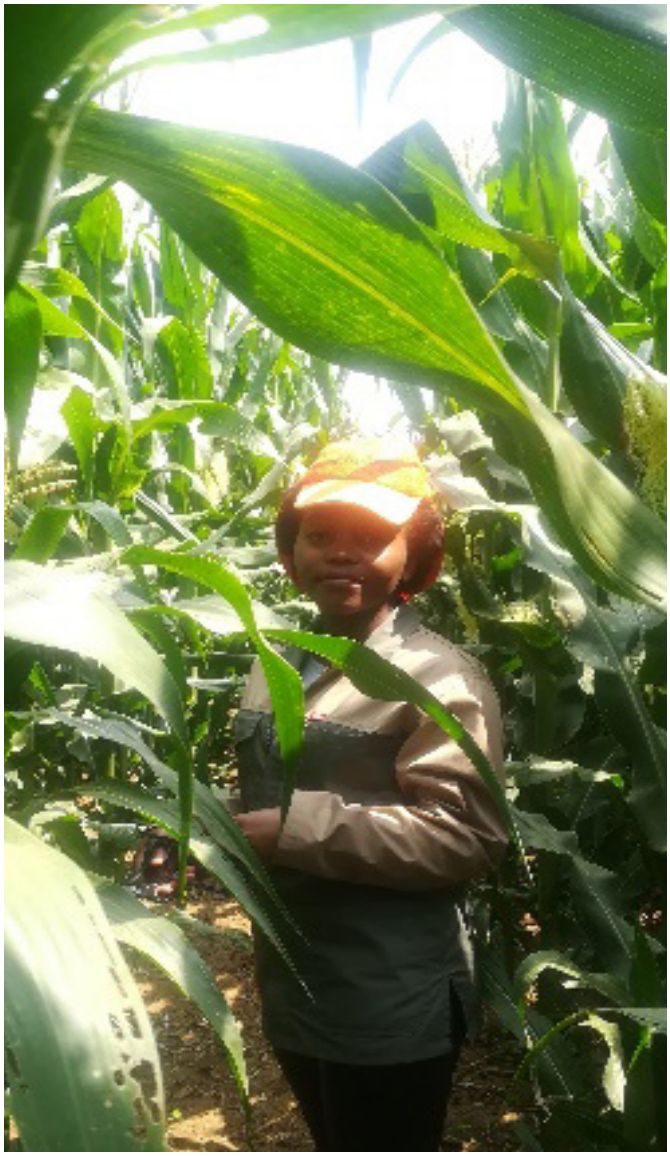
I was in the 3rd cohort of the IMCDA program funded by AGRA at UKZN. I conducted my research and internship at SeedCo South Africa and Zimbabwe. My MSc research study was on evaluating Genotype by Environment Interaction and Traits Association in Maize Hybrids.

The research enabled me to assess the genotype by environment interaction (GEI) for grain yield and stability among experimental maize hybrids in Zimbabwe and Zambia and determine genotype by trait associations and the relationship between multiple traits. The study was a great success as it assisted in identifying 4 high yielding and stable experimental hybrids that were recommended for further evaluation in METs and the production target environments in Zambia and Zimbabwe.

After graduating for my MSc degree, I was employed at the University of KwaZulu-Natal as a Volunteering Intern by NRF/SAASTA. I gained several skills, including soft skills such as good communication, project management, liaising with stakeholders, hosting workshops and science shows for primary and high school learners.

In 2019 I got a job at Bayer as a Seed Product and Pipeline Delivery Intern. My responsibilities include ensuring that we deliver good quality, sufficient and high yielding seeds to the stakeholders, coordinating and assisting in all seed lab operations (shelling, labeling, bar-coding and packaging), coordinating and assisting in field operations (field layout, planting, data collection, sampling and harvesting), managing inventory, sorting and updating seed quantities. I also sample seed for lab fingerprinting (finger printing data), field data collection and analysis. Training, motivating and supervising seasonal workers. Diagnose diseased maize, prepare pathogen inoculum, inoculate and evaluate disease.

Working at a seed Industry has always been one of my goals. It has been a great privilege to have been exposed to the working environment in seed industries, both at SeedCo and Bayer as I can now link all the theory and all the knowledge I acquired during my MSc at the University of KwaZulu-Natal. The exposure has also enabled me to understand breeding in a broader sense, enabled me to work with small-holder farmers and commercial farmers, and build good relationships with the stakeholders.



With all this exposure, theory and practice, I am now confident to say that I am a budding breeder, and I am highly grateful to AGRA, UKZN, Dr Rufaro Madakadze and Prof. Sibiya for such an incredible opportunity and exposure.

Josiah Chimwemwe – University of KwaZulu Natal – From Malawi

In January 2017, I joined the two-year IMCDA program at the UKZN, funded by the Alliance for a Green Revolution in Africa (AGRA) and graduated in September 2019. Prior to joining UKZN, I studied BSc in Agronomy at the University of Malawi and worked for over 4 years, providing agronomic expertise to smallholder farmers under contract farming in Malawi.

The IMCDA program was a unique blend of one-year coursework with a yearlong internship and research at reputable research institutes in Africa, to equip students with hands on experience on plant breeding and seed production pipeline. During the study period, I travelled to Ghana for quantitative plant breeding training; Zimbabwe for seed system workshop hosted by SeedCo and attended the African Plant Breeding Association first meeting at the University of Ghana.

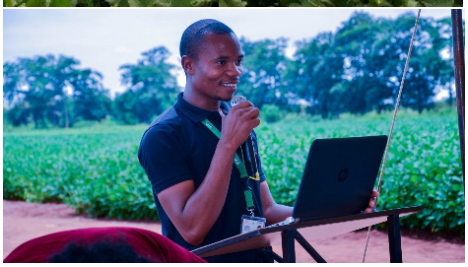
I also visited various seed companies and research institutes within South Africa. I did my internship with Agriculture Research Centre-Grain Crops Institute and conducted MSc research study on breeding for Low N stress tolerance in Maize. The course work, research work, internship experience and the exposure to different scientific gathering within and outside South Africa during the study period technically equipped me to handle any challenges related to plant breeding and seed systems, which I can face along my career path.

Having studied MSc Plant Breeding UKZN under IMCDA, several career opportunities opened up. I got my first job with International Institute of Tropical Agriculture (IITA) as Technology Transfer Specialist in November 2018 toward the completion of my research work. With IITA, I was also involved in conducting cowpeas breeding trials as well as production of early generation seed for cowpea and soybean. Effective 1st September 2019, I got a new job within the Malawi seed industry with SeedCo Malawi Limited working as Seed Production Officer (Seed Inspector) involved in hybrid maize and legume seed production.

Outside SeedCo work, I technically backstop a family seed business investment which is owned by my father. Benefiting from Seed production and seed business expertise I acquired from IMCDA program, my father is currently among the big growers of soya bean basic and certified seed in Malawi for the government released soybean varieties called Tikolore and Makwacha. This is also my original contribution towards widening access to the seed of improved government released soybean varieties by the smallholder farmers in Malawi and Zambia. My future career plans are to continue working within the seed industry while also exploring PhD scholarship opportunities in Plant breeding and Seed Systems.

Special thanks to IMCDA project manager Prof Julia Sibiya and AGRA for funding my studies. Special acknowledgement should also go to Dr Kingstone Mashingaidze, Dr Cousin Musvosvi and Dr Amelework Beyene Assefa for their significant technical contributions towards my studies.

Josiah at Agricultural Research Centre for his research and internship and at SeedCo in Malawi where he works



Hands on experience; trial field in Malawi and addressing participants at a field day

McDonald Nundwe University of KwaZulu Natal Alumni from Malawi

I enrolled for MSc. Plant Breeding at the University of Kwazulu-Natal, Pietermaritzburg campus in South Africa in 2016 with funding from AGRA. It was a two-year program.

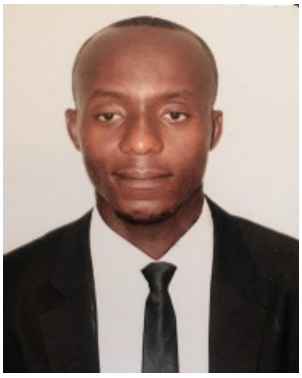
My research and internship were done in Potchefstroom, at the Agriculture Research Council-Grain Crops Institute (ARC-GCI), sorghum breeding department, under the mentorship of Dr. Nemera Shargie. Upon completion of my studies I joined the International Institute of Tropical Agriculture (IITA) as Research Associate based in Malawi.

The key courses which were covered in my first year of study included Genetics, Statistics and Molecular Plant Breeding. These provided an understanding of gene action on inheritance of traits, field evaluation techniques which generate reliable data and statistical procedures thereby accurately interpreting the data. My research focused on characterization of sweet sorghum for biofuel production for both agro-morphological and molecular markers. The study identified five accessions as superior in juice yield. It also identified traits that can be used for both direct and indirect selection for sweet sorghum improvement program.

My work at IITA involves managing soybean breeding trials for Malawi, Chipata (Eastern Zambia) and Mozambique. I work under the leadership of Dr. Godfree Chigeza, who is based in Lusaka, Zambia. I am also coordinating the soybean trials for the Pan African Variety Trials Project (PAVT), a project funded by the USAID, the University of Illinois and the Soybean Innovation Lab (SIL), through the Agricultural Diversification Activity. The project aims at fast tracking introduction, testing and release of soybean varieties thereby providing a wide access of improved soybean varieties to farmers than what is currently available.

This project is done in collaboration with the Department of Agricultural Research Services (DARS), the national research services in Malawi. Through this project we have evaluated materials from seven countries, from Africa and overseas and identified some superior materials which will be due for release soon. We also organize field days where different stakeholders are invited to learn about the soybean materials available and under evaluation.

I have now acquired extensive hands on experience in agricultural research and germplasm maintenance. I am also gaining knowledge on how to successfully run a breeding program. I owe my success to the Alliance for a Green Revolution in Africa (AGRA), for sponsoring my study and research at the University of KwaZulu-Natal, South Africa. Above all, I am grateful to Dr. Julia Sibiya and Dr. Nemera Shargie for the advisory role throughout the study period.



Alex Yeboah – Kwame Nkrumah University of Science and Technology Alumni from Ghana

After the completion of the Master of Philosophy in Plant Breeding sponsored by AGRA at KNUST in November, 2018 and a successful graduation in February, 2019, I was employed by the CSIR-Savanna Agricultural Research Institute in Nyankpala in the Northern Region in March, 2019 as a Principal Technologist to assist the Rice Improvement Program division.

My duties are to assist the lead Breeder in cultivar development, assist in producing high quality breeder and foundation seeds, establish rice trials, record data, analyze data, writing of reports as well as assisting BSc and MPhil students in carrying out their research works at the division.

The knowledge and skills I acquired during my MPhil. studies enabled me play a huge and significant role as part of the team that proposed to the National Variety Release and Registration Committee of the Ministry of Food and Agriculture of Ghana for the release of six rice genotypes developed by the CSIR-Savanna Agricultural Research Institute on November, 2019. All the six rice genotypes were accepted for release. More so, I am a co-author in the research article 'Evaluation of Yield, Reaction to Diseases, and Grain Physical Attributes of Some Introduced Rice Hybrids in Ghana. International Journal of Agronomy Volume 2019. https://doi.org/10.1155/2019/3926765.' (Abebrese et al, 2019).

I am much grateful to AGRA for sponsoring my studies and KNUST for training and mentoring me through my studies.

Kassim Yussif Baba – Kwame Nkrumah University of Science and Technology from Ghana

My name is Kassim Yussif Baba from Ghana. I got enrolled into the IMCDA program in 2015 and graduated in 2017 with my internship ending in February 2018. I am currently working at CSIR-Savanna Agricultural Research Institute, as a Principal Technologist (Assistant Research Scientist, Plant Breeding) under the Groundnut Improvement Programme. The training set me on a path to an exciting career through the well-structured curricula, particularly the E-Learning modules.

My research activities are well organized as I design all hybridizations and experiments in BMS, export field book and capture data electronically. By this I can reduce errors in data due to human mistakes compared to the initial paper-based data collection I was doing prior to the training. I am also an R statistical programmer. The training I had from the IMCDA program has also made me understand in detail the basic principles of genetics, molecular and conventional plant breeding, mathematics, cultivar development and cultivar placement. As a result, I am now more effective at work and other professional forums than before.

Kassim Yussif Baba at graduation and in his groundnut fields in Tamale

Afua Gyaama Gyimah-Kwame Nkrumah University of Science and Technology Alumni - Ghana

My name is Afua Gyaama Gyimah. I was awarded the AGRA-IMCDA Scholarship in August 2016 to pursue a Master of Philosophy program in Plant Breeding at KNUST, Ghana. I successfully graduated in July, 2019. I was a Principal Technical Officer at CRI before my undergraduate degree and got interested in pursuing plant breeding after attending the short-term technician training at IITA in Ibadan, also funded by AGRA. On completion of my MPhil qualification at KNUST I was upgraded to Principal Technologist at CSIR- Crops Research Institute. I work with Legumes and Oil Seeds Division specifically the groundnut improvement program. The knowledge gained has improved my efficiency as a plant breeding technologist. I am much grateful to AGRA-IMCDA for their sponsorship and to KNUST for the education and mentoring.

Afua in the groundnut program at CRI

Idris Ishola Adejumobi - Kwame Nkrumah University of Science and Technology Alumni - Nigeria

My name is Idris Ishola Adejumobi from Nigeria. I got enrolled into the IMCDA program in the year 2014 and graduated in 2016. I commenced the internship immediately after graduation and completed in the year 2017. I joined the yam improvement program of the International Institute of Tropical Agriculture, Ibadan, Nigeria as a Research Supervisor in 2017. While still working, I started my doctoral research program in 2019 at the University of Kisangani, Democratic Republic of Congo under the MOUNAF Project.

My research focus is on yam genetic diversity in DR Congo using genomic sequencing and the implication for genetic resources management in Central-Africa. The training from IMCDA program has been of great help in my research career. Aside from helping me to secure a good job in a crop improvement research institute, the knowledge from the various e-learning modules are still very helpful in my current doctoral program. Combining this knowledge with acquired skills from my work experience gives me a huge confidence of going through my current research without much challenges.

Idris at IITA Ibadan where he works and in the field

Ibrahim Dembele - Kwame Nkrumah University of Science and Technology Alumni - Mali

I am Ibrahim DEMBELE from Mali. I was sponsored by the IMCDA program from 2014 to 2017 in KNUST / Ghana. After completing my master's program I went back to being a research assistant at the Institute of Rural Economy (IER) as a member of vegetable program at CRRA in Sotuba From 2018 to the present day I am working on the Pan African Bean Research Alliance (PABRA) / West and Central Africa Bean Research Network (W(WECABREN). The courses, both physical and e-modules in plant breeding I learned at KNUST, continue to be relevant to the work I am doing. The internship at the CRI gave me a broad base of breeding different crops.

Besides, I also started my PhD on ARTEMISIA in Mali this year.

Netsanet Abera – Makerere University Alumni from Ethiopia

My name is Netsanet Abera. I joined Makerere University for my MSc in Plant Breeding and Seed Systems in 2014. I was seconded by my home institution, the Ethiopian Institute of Agricultural Research, Pawe Agricultural Research Centre. Upon completion, I was promoted to be an Associate Research Officer at the Pawe Center. My new main responsibilities are developing varieties, monitoring and evaluation of all the research activities. I am very proud that recently, I released my first finger millet variety with an average yield of 2.8T/ha that is resistant to both leaf and head blast. The variety has a potential yield up to 3.8t/ha in some environments. Besides, finger millet, I also work on sorghum.

The support through AGRA and Makerere University made me who I am today. I am very grateful to all who helped me through this journey.

Netsanet in his finger millet and sorghum fields in Ethiopia

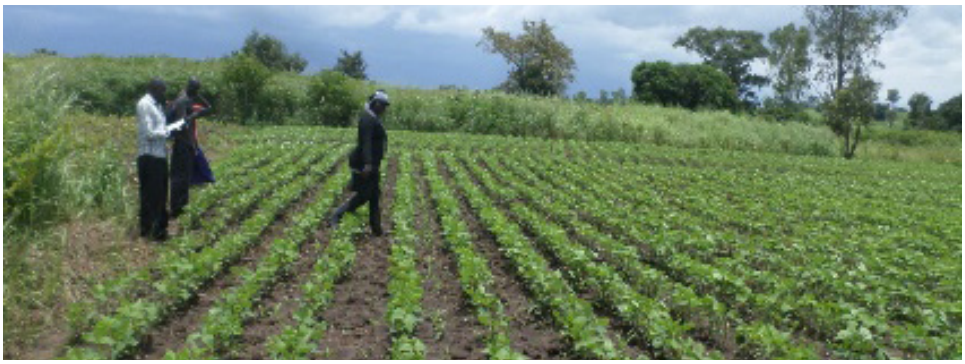
Roy (middle) during two-line rice hybrids parent selection exercise at Malindi Station (November 2018) and Roy (far left) with the Seed Co Kenya Research and Development team during July 2020 crop audit in Kitale

Roy Y Wanjala Namasaka – Makerere University Alumni from Kenya

I am very grateful for the opportunity offered to me to study for an MSc in Plant Breeding and Seed Systems in Makerere University. The scholarship through AGRA was a God sent! This has led me on a great career path. I have gained knowledge and skills that are applicable in the seed industry.

Part of this training was a great internship experience which linked me up with Agri Seed Co Limited, one of the largest seed companies in Kenya and Africa. Now I am a rice breeder in the same company – they employed me after completion of my studies. Recently, after two years, I have been assigned a leadership role as the lead Quality Assurance Officer. This new role has allowed me to interact with various departments from sales, production, research and development and processing. To say the role is exciting would be an understatement. It provides a great opportunity to apply all the breeding and seed technology lessons I learnt from Makerere University while allowing room to constantly learn from the various teams in the different departments.

I would like to thank my mentors at Makerere University, most specifically Dr. Edema and Prof. Gibson who gave me constant guidance. I would say that is the strength of this program. No one walks the path alone and you can always count on those who guided you through the education path to guide you in your career too. In that, I am glad and always grateful I went through this great program and I would recommend it to others too.



Alice in the corner of the field during first season roll out of NURI Program monitoring in the project area of Vura. In the next picture, Alice is in the middle of the field during field inspection of the seed multiplication field

Oriba Alice- Makerere University Alumni from Uganda

Studying under AGRA scholarship was a life changing opportunity. Having a great team of technocrats, mentors, fathers and friends like Dr. Richard Edema, Prof Paul Gibson, Mama Pauline and Candia Alice was a gift that had enormous impact in my life.

Since the completion of the MSc in Plant Breeding and Seed Systems, I have gained profound expertise that is currently applied in my job as Team Leader Agricultural Extension Supervisor. I work for Northern Uganda Resilient Initiative (NURI) that covers the whole of Northern Uganda ranging from West Nile region, North Western region and Acholi sub-region.

Currently, NURI is the biggest DANIDA funded program in Uganda. With the outstanding knowledge, skills and experience I gained in Plant Breeding and Seed Systems, I have been assigned the role of a team leader in charge of 40 staff in the West Nile region. This has given me an opportunity to experiment all the breeding knowledge and principles of seed technology and multiplication leading to increased food security and household income of our farmers.

I am always grateful for the guidance, mentorship, advice and encouragement received from the Makerere University AGRA team ensuring that all worked well for the good of the program and the students. Much as we are gone, the legacy of that AGRA program will continue, and I will always recommend it for people who have the zeal in Plant Breeding.

I am very proud that through AGRA-IMCDA, MaRCCI was borne and is excelling in the capacity building of plant breeders in the Sub-Saharan region.