



2014 AWARD Fellow
Nkiruka Celestina Odoh

Position	Lecturer II
Institution	University of Abuja, Nigeria
Country	Nigeria
MSc	Agronomy, University of Ibadan, 2006
Mentor	Dr. Effiom Essien Oku, Senior Research Fellow, Land and Water Program, United Nations University, Institute for Natural Resources in Africa, Ghana
Research Area	Determination of the arbuscular mycorrhizal fungi (AMF) contribution to drought tolerance in yams.

Since traditional knowledge about managing soil life is dying, building internal soil resources for crop production is a key to promoting sustainable land use.

Nkiruka Celestina Odoh grew up in eastern Nigeria, where business was valued and getting an education was considered a waste of resources, especially for girls. However, with support from her family, she has succeeded academically, and is dedicated to sharing her knowledge in an effort to improve agricultural productivity and the lives of smallholder farmers.

“In my region, people think that one does not need a degree to be a good farmer, and many asked me why I wanted to go to university just to study agriculture,” says Odoh. “My late father, who was a teacher, laid a good foundation for his children academically. My family went to great lengths to ensure that I got a good education, which was really inspiring and further fueled my determination to go far.” Odoh obtained a BSc in Agriculture from the University of Benin in Nigeria, and then completed both an MSc in Agronomy, specializing in Soil Microbiology, and a postgraduate diploma in Teacher Education at UI.

Odoh will soon complete her PhD in Agronomy, which is focused on increasing the drought tolerance of yams through the identification of tolerant varieties. Her research also involves understanding the contributions of AMF to the crop’s drought tolerance.

Yam is an African tuber crop, and about 70 percent of the world’s production comes from Nigeria. It is a primary staple crop, which holds important sociocultural and economic values, especially in West Africa.

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"Yams are part of traditional festivals, and they are served and given as gifts at wedding celebrations," explains Odoh. "In villages, a man's masculinity is measured by the size of the yams he produces."

Because of their need for high moisture, yams are not cultivated in some of the dryer regions of Nigeria. The increasing irregularity and unpredictable nature of the climate are also factors. Odoh has screened 81 accessions of two yam species (*Dioscorea alata* and *Dioscorea rotundata*) for drought tolerance, and subjected them to moisture stress. She also tested the effectiveness of AMF to enhance the productivity of yams under drought stress conditions. AMF are known to have a symbiotic relationship with the crop, helping it to absorb more water and nutrients from the soil. They also help with disease resistance and contribute to remediating polluted soils. While previous research had focused on the benefits of AMF to nutrient uptake and disease resistance in yams, their effects on drought tolerance have not yet been tested.

Odoh found that the combination of the resistant varieties with AMF aided resilience and increased tuber sizes by 30 to 100 percent, depending on the variety tested. The AMF Odoh used were produced in a soil microbiology laboratory, but as a way forward, she wants to identify and test the efficacy of some indigenous species.

"Arbuscular mycorrhizal fungi are microorganisms that are ubiquitous in most soils," says Odoh. "They offer a low-cost, environmentally friendly option for coping with environmental stress. They form symbiotic relationships with most crops, including yams. However, most farmers in sub-Saharan Africa are unaware of their existence, and their cropping practices are hazardous to AMF survival."

Since traditional knowledge about managing soil life is dying, building internal soil resources for crop production is a key to promoting sustainable land use. "The most efficient AMF species are yet to be identified in sub-Saharan Africa," notes Odoh. "I hope to acquire and use advanced molecular tools to characterize and conserve, multiply, process, and package them for continent-wide usage by farmers."

Odoh plans to further expand her research beyond her PhD. She wants to become a renowned soil microbiologist, who is recognized within her university and internationally. "Being an AWARD Fellow has set my feet on solid rock to achieving this," she says. "I have seen that I cannot go far in research without creating a good network with other people. With the help of my AWARD Mentor, my network is already expanding to include experts in other countries, which will really help me to advance in my career."