

### Leveraging partnerships to build the science skills of African women scientists

Celebrating eight years of partnership between AWARD and Agropolis Fondation

#### AWARD

Hosted by the World Agroforestry Centre United Nations Avenue, Gigiri P.O. Box 30677-00100 Nairobi, Kenya

+254 (0) 20 722 4141

EMAIL awardqueries@cgiar.org

www.awardfellowships.org

**Design:** Conrad Mudibo, Ecomedia

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### About AWARD

African Women in Agricultural Research and Development (AWARD) works towards inclusive, agriculture-driven prosperity for the African continent by strengthening the production and dissemination of more gender-responsive agricultural research and innovation. We aim to catalyze transformative change in scientists and agricultural research development (ARD) institutions by enabling these different level actors to conduct and promote agricultural research and innovations that better respond to the needs and priorities of a diversity of women and men across Africa's agricultural value chains.

### **Our vision**

AWARD envisions a robust, resilient, and gender-responsive agricultural innovation system working to drive prosperity and food and nutrition security for Africa.

### **Our mission**

Contributing toward this vision, AWARD is investing in African scientists, research institutions, and agribusinesses to deliver innovative, sustainable, gender-responsive agricultural research and innovation.

Four initiatives form the core of AWARD's programmatic activities:

- The AWARD Fellowship is a career development program that invests in leading women agricultural scientists to ensure a growing cohort of capable, confident, and influential women scientists available to lead critical advances and innovations for the agricultural sector.
- Gender Responsive Agricultural Research and Development (GRARD) supports African research institutions as they seek to produce research that better responds to the needs and priorities of a diversity of both men and women across the agricultural value chain. GRARD also supports African research institutions to build and effectively leverage the talents of more diverse and inclusive teams.
- Gender in Agribusiness Investments for Africa (GAIA) identifies, spotlights, and supports the growth of those agribusinesses with the potential and commitment to bridging the gender gap in African agriculture.
- AWARD Training designs customized learning experiences focused on building the leadership, mentoring, scientific research, and technical gender skills of Africa's agricultural research workforce and decision makers.



## agropolis fondation

# Agropolis Foundation: A world-class scientific network within the Montpellier scientific community

Agropolis Fondation is a French scientific foundation established in 2007 which promotes, through research and higher education, the development and sharing of knowledge in the service of stakeholders in agriculture and sustainable development. Its dual approach of strengthening as well integrating different scientific fields aims to address complex issues linking agriculture and society.

Located within the world-class Montpellier scientific community, The Agropolis Fondation is at the heart of a network that brings together over 1500 scientists as well as 600 PhD students and Postdocs working within 41 research units.

The research conducted by members of the Agropolis network covers a wide range of disciplines from bio-technical to social sciences and with recognized expertise in temperate, tropical and Mediterranean regions. The network has access to first-rate research facilities including laboratories, experimental fields, technical platforms and an outstanding germplasm repository of temperate, Mediterranean and tropical crop species.

In the past 10 years the Agropolis Foundation has granted scientific projects on cultivated plant diversity, biology and breeding, crop protection, sustainable agriculture and food systems, agro-ecological transition, adaptation to climate change, food processing and quality, socio-economics and public policies.

Active beyond Montpellier, the Agropolis Fondation also engages network of over 400 international partner institutions, including AWARD.

Its charter members are Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), Institut de recherche pour le développement (IRD), SupAgro, Institut National de Recherche Agronomique (INRA) and the University of Montpellier. These institutions are top French institutions for development-oriented research and higher education in agriculture, food and the environment.

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### Celebrating eight years of partnership between AWARD and Agropolis Fondation

The partnership between Agropolis Foundation and African women in Agricultural Research and Development (AWARD) has made tremendous contribution to our shared mission of building and sustaining a strong, effective talent pool in agricultural research for Africa.

In its mission to promote and support high-level agricultural research for sustainable development, in 2009, Agropolis Fondation entered into a partnership with AWARD to build the science skills of African women scientists though the AWARD Fellowship.

A particular focus has remained on Advanced Science Training (AST) placements for African women scientists in some of the leading French research labs. Advanced Science Training placements are designed to strengthen and expand the women scientists' technical expertise in their selected area of research. AST placements also help African women scientists broaden their professional networks. For French scientists, hosting an AWARD AST placement offers deep insight into the research agenda and context within Africa. AST placements also offer both French and African scientists the opportunity to enter into new and ongoing research collaborations.

The first AWARD fellow to benefit from the partnership between AWARD and Agropolis Fondation was a Nigerian woman scientist who was investigating food quality and industrial potential of Nigerian yams. Since then, many more women have had the opportunity to deepen their skills and widen their networks.

Between 2011 to 2017 the Agropolis Fondation hosted a total of 15 women scientists from eight African countries shown in the table below.

### AWARD Fellows supported for Advanced Science Training by Agropolis Fondation

Name	Host Institution within Agropolis	Supervisor	Start Date	End Date	Research Topic
Amata Ruth	Centre de coopération internationale en recherche agronomique pour le dével- oppement (CIRAD)	Dr. Philippe Roumagnac & Dr. Philipp Rott	Feb. 7, 2012	Jul. 31, 2012	Developing a loop mediated isothermal amplification (LAMP) method for detecting sugarcane yellow leaf virus
Ebah Djedji Catherine	CIRAD	Dr. Marc Valente & Dr. Isabelle Maraval	May 5, 2015	Dec. 31, 2015	Quality assessment of attiéké by combining quantitative sensory analysis and instrumental measurements
Ejoh Shirley Isibhakho- men	Institut National de Recherche Agronomique (INRA)	Dr. Catherine Renard	Sept. 8, 2013	Mar. 4, 2014	Nutritional characterisation of traditional leafy vegetables from Nigeria: vitamin C, carotenoids, folates and minerals.
Ezeocha Chinelo Vanessa	CIRAD	Dr. Dominique Pallet	Jan. 9, 2017	Dec. 20, 2017	Improving nutrition and access to food through deployment of underutilized yams
Kolade Olufisayo Atinuke	University of Perpignan France	Dr. Olivier Panaud	Apr. 25, 2016	Jun. 10, 2016	Bioinformatics
Mounjo- uenpou Pauline	CIRAD	Dr. Angelique Fontana	May 26, 2014	Dec. 5, 2014	Biological control of mycotoxin contamination in food and development of a rapid detection method
Moyib Kehinde	CIRAD	Dr. Marie- France Duval	Apr. 20, 2012	Oct. 22, 2012	Genetics/ diversity study

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Name	Host Institution within Agropolis	Supervisor	Start Date	End Date	Research Topic
Mukantwali Christine	CIRAD	Dr. Pierre Brat	Feb. 1, 2012	Jul. 31, 2012	Improving pineapple processing technique
Munyiri Shelmith	CIRAD	Dr. Ange-Marie Risterucci	Sep. 10, 2012	Apr. 10, 2013	QTL mapping for maize stem borer resistance
Narh Mensah Deborah	Laboratoire des Symbioses Tropicales & Méditerran- éennes (LSTM –INRA)	Robin Dupponois	Feb. 4, 2016	May 18, 2016	Valorisation de souches de champignons comestibles en tant que Biofertilisants (Evaluation of edible fungi strains as Biofertilizers
Niang Belko Mareme	CIRAD	Dr. Laurent Laplaze	June 15, 2014	April 25, 2015	High throughput phenotyping of root traits for drought tolerance in pearl millet
Odoh Nkiruka Celestina	CIRAD	Robin Dupponois	Oct. 6, 2017	Dec. 23, 2016	Description and valuation of the diversity of Mycorrhizal fungi associated with yam.
Otegbayo Bolanle	Institut national de la recherche agronomique (INRA)	Dr. Olivier Gibert & Dr. Thierry Tran	May 1, 2011	Mar. 2, 2012	Molecular characterization of modified (acetylated and acid modified) yam starches.
Tomo Alda	CIRAD	Dr. Martine Antona	Apr.17, 2012	Jul. 17, 2012	Assessing Livelihood adaptation strategies to climate change in Mozambique and their conditions
Wireko- Manu Faustina Dufie	INRA	Dr. Catherine Renard	Sep. 15, 2013	Mar. 6, 2014	Characterization of volatile and bioactive compounds in selected Ghanaian fruits and vegetables, and impact of traditional preparation methods

### These are the stories of the fellows

	Position	Research Administrative Manager
as	Institution	Africa Rice Center (AfricaRice)
Present.	Country	Nigeria
as-	PhD	Environmental Biology (Molecular Genetics), University of Ibadan (UI), Nigeria, 2013
Olufisayo Atinuke Kolade 2014 AWARD Fellow	Mentor	Morufat Oloruntoyin Balogun, Tissue Culture Specialist, International Institute of Tropical Agriculture (IITA); Plant Geneticist, UI
	Research area	Marker development, gene discovery, and disease- and pest-resistance breeding of rice varieties to improve yields, promote food security and reduce poverty, while protecting the environment.

Olufisayo Atinuke Kolade grew up in western Nigeria where she was exposed to gardening at a young age. "We had a kitchen garden and I liked to help with the harvesting," she says. This influenced her decision to pursue a degree in botany, and later a career that has included studies on cassava, yam, cowpea, and rice.

Kolade's national youth service at IITA exposed her to cytogenetics the study of chromosomes. She was involved in a project targeting the selection of cassava hybrids for increased yields. "I realized that I could have an input into agriculture and help improve people's livelihoods," she says. This prompted her to move away from pure botany to study molecular biology.

She undertook her MSc studies while working at IITA, as part of a project researching anther culture of cassava, a breeding technique for improving crops for yield and other desirable qualities.

Kolade changed crops to cowpea for her doctoral research and studied the molecular characterization of transposable elements. "These are called



jumping genes because they move around in plants and animals and can cause variation," she explains. "The genes can be used positively to induce planned variations, such as inducing resistance to a particular pest." Natural resistance is desirable because it protects the environment and guarantees a good yield.

Currently, Kolade is a member of two research projects at AfricaRice, where she is a research administrative manager. One team is breeding rice to introduce genes that can resist rice yellow mottle virus, which causes yellowing of leaves, stunted growth, and sterility, and can cause losses of up to 80 percent of the crop in the field. The disease mainly affects rice in Africa.

The other project is on mapping genes—identifying the gene responsible for a trait—for resistance to African rice gall midge. This insect pest, which affects mainly rain-fed and irrigated lowland rice and occurs only in sub-Saharan Africa, is common in the lowland ecologies of Nigeria. The team has identified resistant rice varieties, and is trying to identify the gene(s) responsible for the resistance. The plan is to introduce this gene or genes to susceptible varieties.

Apart from conducting research, Kolade has trained researchers from national agricultural research institutes in Africa on basic molecular techniques. She plans to use her experiences as an AWARD Fellow to mentor junior female staff members, helping them to be more focused in their work and to attain higher levels in their profession.

Kolade also expects the program to help her achieve her goal of becoming the director of a Nigerian research institute, and contributing significantly to resistance breeding of rice using molecular tools.

"I want to improve the livelihoods of smallholder farmers in Nigeria by developing better crop varieties," she says. "If I am director of a research institute, I will be able to influence policy and make research more gender responsive."

Encouraged by the career-development training that she has received through AWARD, Kolade is enthusiastically pursuing her revised road map. "I have already learned how to create my future, and not just leave it to chance," she says. "Being an AWARD Fellow will help me to increase my visibility and confidence, which will serve to promote the image of my institution."

	Position Institution	Research Scientist Council for Scientific and Industrial Research— Food Research Institute (CSIR-FRI)	
AL IN	Country	Ghana	
	MSc	Biotechnology, Wageningen University, 2013	
<b>Deborah Louisa Narh Mensah</b> 2014 AWARD Fellow	Mentor	Dr. Charles Tortoe, Head of Food Processing and Engineering Division, CSIR-FRI	
,	Research area	Improving mushroom cultivation techniques using various biotechnological tools, and analyzing the antibacterial and antioxidant potential of mushrooms.	

Deborah Louisa Narh Mensah never suspected that the mushrooms she saw growing in the wild as a youth would become a central focus of her early career.

When Mensah began studying biological sciences at Ghana's Kwame Nkrumah University of Science and Technology, she acquired a taste for research, but had no idea how or where she would apply it.

The answer came the following year during her compulsory national service. By chance, she was assigned to CSIR-FRI's Mushroom Unit. "Until then, all I usually heard about mushrooms was how dangerous they could be," she says. "I had no idea of their benefits—or that such a small thing could improve lives in so many ways."

Though widely underappreciated, mushrooms contain both nutritional and medicinal properties. Numerous varieties grow in Ghana, but the oyster mushroom (Pleurotus ostreatus), originally from China, is the most commonly consumed. Like many other edible varieties, it contains low dietary fat, but is high in protein, B vitamins, and antioxidants (thought to reduce cell damage and prevent disease). In her current research, Mensah is analyzing the antioxidant activities of different varieties of wild and cultivated mushrooms. She is also involved in collecting, classifying, preserving, and analyzing Ghana's indigenous and wild mushrooms to protect their biodiversity and better understand their characteristics.



Beyond their food and nutritional value, mushrooms also offer an environmental plus. "We can produce mushrooms using various agroindustrial waste products, reducing pollution and increasing gains from the production chain," says Mensah, explaining that mushrooms thrive on all sorts of dead or discarded plant material. She has experimented with growing mushrooms using cotton waste, plantain leaves, rice straw and husk, wheat bran, cassava peels and sticks, and yam peels.

Mensah is working with women cassava farmers in Sierra Leone, using the cassava waste to produce oyster and other mushrooms as a source of nutrition, improved health, employment, and income. She is teaching groups and interested entrepreneurs in Ghana to produce spawn, which is used as seed and can be cultivated or sold. Mensah, together with her colleagues, also produce hybrid mushrooms, which they share with entrepreneurs in Ghana, Sierra Leone, Trinidad and Tobago, and other countries as they inform them about mushroom cultivation, teaching them to create hybrid varieties that could increase consumption and marketability. Mensah also conducts participatory work with farmers on the indigenous use and knowledge of mushrooms.

Mensah recently took a study leave from her research institute to complete an MSc in Biotechnology at Wageningen University in the Netherlands. Her research included extracting and purifying an enzyme called polyphenol oxidase in Irish potatoes, which causes browning in various bacteria, plants, and fungi, including mushrooms, in order to understand its properties and function, and to reduce its effects during storage and processing.

Mensah also looked at the adaptive evolution of the bacteria Lactobacillus helveticus, which is involved in the fermentation of milk for producing cheese. She intends to use the skills acquired in this thesis to study common indigenous foods of West Africa, such as gari. "By isolating the organisms involved in the fermentation process, we can try to evolve them to work more quickly or adapt to changing conditions, such as a warmer environment for improved functionality," she explains.

Going forward, Mensah plans to pursue a PhD and move up the research ladder, and hopes to eventually become a leading female scientist and director of a research institute. She sees her AWARD Fellowship as a lifechanging opportunity to hone her skills and raise her profile to benefit her career, her institute, smallholder farmers, and other stakeholders.

"AWARD can help me get into the limelight, attract funding, and become more renowned scientifically, which will be a big plus for my work and my institute, as we apply research to improve lives," says Mensah, who has already connected with global mushroom researchers through AWARD.

	Position Institution Country MSc	Lecturer II University of Abuja, Nigeria Nigeria	
Nkiruka Celestina Odoh	Mentor	Agronomy, University of Ibadan, 2006 Dr. Effiom Essien Oku, Senior Research Fellow, Land and Water Program, United Nations University, Institute for Natural Resources in Africa, Ghana	
2014 AWARD Fellow	Research area	Determination of the arbuscular mycorrhizal fungi (AMF) contribution to drought tolerance in yams.	

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. "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."

63	Position Institution	Senior Research Officer National Root Crops Research	
	Country	Institute Nigeria	
	MSc:	Food Processing and Preservation, Michael Okpara University of Agriculture—Umudike (MOUAU), 2006	
<b>Chinelo Vanessa</b> <b>Ezeocha</b> 2014 AWARD Fellow	Mentor:	Professor Philippa Ojimelukwe, Food Science and Technology, MOUAU	
,	Research area	Development of value-added products and improved storage methods for <i>Dioscorea dumetorum</i> (yams) to improve food security and livelihoods of farmers.	

Chinelo Vanessa Ezeocha and her siblings learned about growing food on their mother's large farm in southeastern Nigeria. Early on, she developed a curiosity for cooking and experimenting with ways to transform foods. "By the time I was ready for university, I knew I wanted to study courses related to food or nutrition," she says.

Ezeocha completed a BSc in Food Science and Technology at MOUAU and was then assigned to a crops research institute as part of her compulsory national service. There, she learned about food processing and preservation, and became interested in root and tuber crops.

"Yam, cassava, sweet potato, and cocoyam are major food staples in Nigeria, grown primarily by women," says Ezeocha. "But a large percentage of crops are lost after harvest due to spoilage and storage problems." Her aim is to help farmers develop ways to process these crops, preserve their benefits, and increase their value. This has been the primary focus of her work throughout her MSc and PhD research.

The range of processed products that can be made from root and tuber crops is extensive. "We have come up with cocoyam chips, drinks from sweet potato, cassava starch salad dressing, and confectionery flour," notes Ezeocha, citing some examples. She also has ongoing work to analyze possible pharmaceutical uses of these crops.

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Currently, Ezeocha is especially focused on yams (Dioscorea dumetorum) and on improving postharvest storage and product development with farmers in southeastern Nigeria. The crop is high yielding and a good source of carbohydrates, minerals, and proteins (relative to commonly consumed yam varieties), but it begins to harden 24 hours after harvest.

She is investigating conventional and non-conventional storage methods and materials, along with processing solutions that could extend its uses and shelf life.

Ezeocha's work is very participatory and greatly enriched by what she learns in the field. "I discover innovative methods that farmers are using to store or process crops, like hanging yams upside down, or alternative methods for producing garri from cassava, which we take back and test in the lab to better understand the science behind them," she says.

Ezeocha also conducts training sessions with women and youth on processing technologies, such as manual chipping machines. She encourages them to be creative and adapt what they have to produce value-added products that can generate employment and income. She also recommends that they form cooperatives, which may enable them to achieve more than they can do alone, such as opening a shop or accessing market outlets.

Reaching women farmers can be a challenge, however. "When we announce trainings, we frequently get only male participants," says Ezeocha. "Often, men will not let their wives attend, in part because they think there will be money involved." Her solution is to conduct trainings specifically for women, generally through church and village-based women's groups.

Some of Ezeocha's greatest satisfaction derives from women's responses to the trainings. "Sometimes, they will call me afterwards to thank me for helping them find a source of livelihood," she notes. "They also come and give testimonials during our in-house reviews."

Following her PhD, Ezeocha aims to broaden her experience through a post-doctoral fellowship in an institution abroad. Being an AWARD Fellow is helping her to develop the networks and skill sets she needs to achieve that goal, along with her longer-term vision of becoming a leading researcher and influential decision maker.

"I hope to lead major research breakthroughs in reducing postharvest losses, direct a research institute, and influence the research agenda to ensure that the challenges of the smallholder farmers remain a major focus," says Ezeocha.

	Position	Senior Researcher	
( in the	Institution	Institut de Recherche Agricole pour le Developpement (IRAD)	
	Country	Cameroon	
MOL	MSc	Biotechnology and Microbiology, Montpellier University, France, 2008	
Pauline	Mentor	Dr. Noé Woin, Director General, IRAD	
<b>Mounjouenpou</b> 2013 AWARD Fellow	Research area	Value addition and processing of cocoa and coffee beans with women and men farmers, including	
~		prevention of ochratoxin A infection.	

As a child, Pauline Mounjouenpou wondered why her parents always had plenty of food for their nine children during harvest, but went hungry at other times of the year. "My parents were poor, illiterate peasant farmers, and I used to help them on the farm, especially during harvest," she recalls. Mounjouenpou decided to become a scientist to help ensure that her family would have food all year round. In secondary school, she specialized in sciences, and later majored in food sciences during her first university degree, graduating as a food technology engineer.

During her first job at IRAD in Cameroon, Mounjouenpou wanted to work on the processing of and value addition to agricultural products, but she was not entirely happy with the available opportunities. The French embassy provided a scholarship for both her MSc and PhD training in microbiology/biotechnology, specializing in food technology. She graduated from Université Montpellier 2 (known as Université des Sciences & Techniques) while working at the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD).

Among the first women at IRAD to hold a PhD, Mounjouenpou was promoted to chargé d'études (senior researcher). She started working with women cocoa farmers in a producers' association, which attracted funding from the World Cocoa Foundation. The association has its own cocoa farm, and the women share the farming and marketing tasks.

"I train individual women farmers to develop their own small businesses," Mounjouenpou explains. "They produce cocoa butter, cocoa powder, and a popular soy-based chocolate drink. The challenge is that once the cocoa is



harvested, it belongs to the men, who rarely share the profits or give beans to their wives. In fact, in times of plenty, some take a second wife. However, they really like this chocolate drink and cocoa butter, which is an incentive to provide their wives with the raw material."

As a mother of six young children (her own four and her late brother's two), Mounjouenpou delights in seeing real changes in the lives of women farmers. She credits her successful work with about 150 women farmers to the awareness meetings that they attend with their husbands. Men now act as partners and supporters of the project, realizing that when they share the cocoa beans with women, everyone benefits.

Mounjouenpou is monitoring the women who initially joined the group and finds that they are still producing. However, finding more interested women and convincing the pilot women farmers to train others is a challenge. In the main cocoa and coffee-producing regions of Cameroon, Mounjouenpou is working with cocoa and coffee producers to develop useful products for local consumption and potentially to export, using byproducts that are normally discarded. "What is considered waste, such as the husks of cocoa and coffee, can be processed into fertilizer, while extracting potassium for soap production," she explains.

Following her post-graduate research on ochratoxin A, a mycotoxin produced by Aspergillus carbonarius or A. niger that spoils cocoa and coffee beans, Mounjouenpou is interested in finding the point of contamination of the harvested product. The European Union has set tight thresholds for ochratoxin A, so economically important agricultural products from Cameroon cannot be exported, or are destroyed at the point of entry. Mycotoxin production seems to thrive especially under humid conditions so appropriate postharvest handling of cocoa and coffee is critical. Traditionally, farmers help each other harvest the cocoa beans, but this leads to delays in opening the pods because each farmer tries to collect as many as possible before it is his or her turn to have all the others help. During harvesting, the pods are often slashed by farmers' machetes, providing entry points for the ochratoxin A-producing fungi while the beans are stored. Results of the research on Ochratoxin A in Cameroon cocoa and coffee contributed towards Mounjouenpou being elected best junior researcher of the 2013 by the Cameroon Ministry of Scientific Research and Innovation.

A skilled scientist and strong advocate for women, Mounjouenpou hopes to encourage others in her field. "My AWARD Fellowship will give me the opportunity to become a role model for other francophone African women scientists and for girls in secondary schools," she states. "I look forward to networking and collaborating internationally, and I am hoping to improve my leadership and science skills. Eventually, by influencing policy, I will break the glass ceiling that still exists for many women in my country." Leveraging partnerships to build the science skills of African women scientists Celebrating eight years of partnership between AWARD and Agropolis Foundation

	Position	Agronomist	
	Institution	Centre d'étude regional pour l'amélioration de l'adaption á la secheresse, Institut sénégalais de recherche agricole (ISRA)	
College and	Country	Senegal	
Marème Niang	MSc	Agronomy, Ecole Nationale Supérieure d'Agriculture de Thiès (ENSA), 2006	
<b>Belko</b> 2013 AWARD Fellow	Mentor	Dr. Samba Thiaw, Director of Research, ISRA, Bambey	
~	Research area	Studying agro-physiological traits of crops, including pearl millet and sesame, to improve tolerance to drought under the West African Agricultural Productivity Program.	

Marème Niang Belko knows first-hand the challenge of producing crops in arid Senegal, where only 20 percent of the land is arable, according to a 2010 Work Bank report, and less than 700 mm of precipitation is recorded annually. As a farmer's daughter from St. Louis, northern Senegal, she cultivated tomatoes, potatoes, and rice right alongside her father and her six siblings in the family's sandy, coastal fields, where daily temperatures can reach up to 45 degrees Celsius.

"When I decided to study agriculture, my father strongly supported me because he wanted an advisor in the family," laughs Belko, who graduated with a BSc in agricultural engineering from ENSA in 2004--one of only four women in her class of 28 students. "I wanted to help him, and other Senegalese farmers, especially the women. They are so strong in spirit and work very hard, and yet remain so poor." She later obtained an MSc in Agronomy. Belko believes that farmers could benefit from drought-tolerant and biofortified pearl millet varieties that have potential to increase crop yields and thereby improve livelihoods Senegal.

"Senegalese prefer the taste of Asian rice over locally grown varieties and over millet," says Belko, noting that Senegal, which imports more than half of the food required to feed its 13 million people annually, is the world's tenth largest rice importer. Although people are beginning to consume local rice because it is cheaper, Belko wants to change people's dependency on imports by promoting local crops, especially pearl millet. Pearl millet is one of the principal cereal crops grown in Senegal's semi-arid agroecosystem. It is well adapted to growing



areas characterized by drought, low soil fertility, and high temperatures, and performs well in soils with high salinity or low pH. Because of its tolerance to difficult growing conditions, it can thrive where other cereal crops, such as maize or wheat, would not survive. Pearl millet is affordable, but it must be pounded into flour for consumption so women prefer rice or maize, which are more expensive but less labor-intensive.

"In my research at ISRA, I'm testing pearl millet production in two contrasting zones of rainfall to see the difference in yields and what mechanisms they use to adapt to drought," says Belko, a talented researcher, who is completing her PhD in Applied Biological Sciences at Ghent University in Belgium. "We are seeing the effects of climate change here in Senegal—too much rain, too early—and farmers don't know when to sow anymore. They are experiencing reduced yields and crop failure, but they don't understand what is happening."

Crop diversification is one way to improve livelihoods and Belko is conducting seed multiplication of highyielding mutants of sesame to be used in greenhouses, field stations, and farm-field trials. "Sesame is not yet popular as a food in Senegal, but it is a viable cash crop," she says. "There has been a lot of research done on sesame, but the information is not making it out to the farmers because of distance and funding constraints. We need to produce good varieties, give farmers access to them, and train them how to multiply the seeds themselves". As part of her PhD research, Belko is also studying germination and drought-resistance of baobabs, the "upside-down" trees that are indigenous and prolific in Senegal. "Baobab trees are difficult to grow because their seeds are very hard and they don't germinate easily," explains Belko. "However, the trees have so many uses. The leaves are pounded into couscous or added to soup, and can be used as a traditional treatment for dysentery, and also to make soap." The fruit's pulp makes tasty jam and nutritious juice that is served in most Senegalese homes. Belko would like to see women farmers maximize the trees' produce to increase their incomes.

Belko is one of five African women who won a fellowship in the AWARD Francophone Pilot Program, in partnership with CORAF/WECARD and Agropolis Fondation. "I am so happy to have won this fellowship," says Belko proudly. "It is a great opportunity that will strengthen and motivate me in my work. I know it is going to inspire me to think about new projects and build my leadership capacity so that I can help farmers even more." She also wants to hone her writing and science skills through courses offered by AWARD.

Meeting fellow women scientists from across Africa through AWARD is encouraging, says Belko. "Women bring a lot to science because of our motivation to help others. AWARD is going to enable us to advance so we can help women farmers further, and be good examples for our younger sisters who are following us."

	Position Institution	Researcher Centre National de Recherche Agronomique (CNRA)	
The state	Country	Côte d'Ivoire	
- MA	MSc:	Food Technology and Sciences, University of Tennessee,1987	
<b>Catherine Ebah</b> <b>Djedji</b> 2013 AWARD Fellow	Mentor:	Dr. Kouame Christophe, Senior Scientist World Agroforestry Centre (ICRAF)/ MARS	
	Research area	Evaluation of physicochemical and rheological characteristics of new cassava varieties and their processing.	

Catherine Ebah Djedji spent summer vacations as a child on her grandparents' farm, which influenced her later interest in an agricultural career during her university studies. She focused on chemistry, biology, and geology, but was also introduced to courses in agriculture and agronomy. The combination sparked her interest in food processing, and she successfully competed in the United States Agency for International Development African Graduate Fellowship Program to study at the University of Tennessee's College of Agriculture, where she completed an MSc in Food Technology and Sciences. Through her studies and work experience at both the Centre Ivoirien de Recherche Technologique (CIRT) and Centre Nati of one of Africa's most basic food crops, cassava, that has captivated her attention.

Cassava is a major food staple for most African countries. In Cote d'Ivoire, attiéké is the most commonly consumed dish made from cassava. Similar to couscous, it is fermented and ground to a pulp that is grated, granulated, or steam cooked. In addition, the crop offers flexibility and promise as a processed product. "There is so much to do with cassava," says Ebah Djedji. "Because of its high starch content, viscosity, and food-stabilizing or gel-making capacity, cassava also can be used in the food, textile, paper, cosmetics, and pharmaceutical industries."

The CNRA, where Ebah Djedji currently works, has a collection of more than 500 varieties of cassava, with many newly created, some of which offer yields that are double or triple those of traditional varieties. The question for Ebah Djedji and her colleagues is whether the higher-yielding varieties also contain



the processing, nutritional, and other qualities required to meet user needs and consumer demands. They are progressively working their way through the institute's full cassava collection to evaluate the physical, chemical, and nutritional aspects of different varieties. They are collaborating with cassava breeders to provide data that can inform the varietal development process.

As part of this work, Ebah Djedji is analyzing novel applications of cassava starch, based on some of its fundamental properties, including molecular weight distribution and interactions between starches and crystalline structures. "From this we can interpret the film-forming, thickening, or gelling properties of the starches from different varieties," she explains. "This is important for encapsulating food or cosmetic and pharmaceutical ingredients." The research also is helping to enhance the fundamental understanding of starches and their practical uses more broadly.

Ebah Djedji is also focused on standardizing cassava-based food quality and existing processing technologies across the country. "The cassava sector is not well organized in Côte d'Ivoire in terms of standardization of food-based products, dissemination of technologies, or even among farmers themselves, particularly when contrasted with cash crops, such as coffee or cocoa," she notes. Cassava is not considered a cash crop, and it is almost exclusively grown and processed by women. Ebah Djedji's aim is to help them transform their crops into value-added products that can improve their livelihoods. "We are helping to train them to organize in associations and cooperatives so that they can work like a small business, increasing efficiencies and benefits," she says. Technologies are available for women to engage in small-scale processing, she notes, and the demand for cassava-based food, such as attiéké, is high all across the continent and among Africans abroad as well.

Ebah Djedji is dedicated to promoting technology transfer among women, through training and farmerto-farmer programs. She hopes to pursue this further once she has obtained her PhD from the Université Nangui Abrogoua in Abidjan. She has completed her dissertation, but her defence was delayed due to political unrest, which disrupted the country and her university. She plans to defend her thesis and obtain her doctorate in the near future.

Given the very few women in her field, Ebah Djedji is a pioneer in Côte d'Ivoire. "It is challenging, but fascinating," she says. She is one of five African women who won a fellowship in the new AWARD Francophone Pilot Program, in partnership with CORAF/WECARD and Agropolis Fondation. As an AWARD Fellow, she sees the potential to be connected to broader networks, and looks forward to learning leadership and development skills that will help her achieve her research and career goals. "The fellowship is already opening doors for me, within national institutions and internationally."

	Position	Lecturer	
66	Institution	Kwame Nkrumah University of Science and Technology (KNUST)	
	Country	Ghana	
200	PhD	Food science and technology, KNUST, 2009	
Faustina Dufie Wireko-Manu	Mentor	Ibok Nsa Oduro, Lecturer Food sciences and technology, KNUST	
2011 AWARD Fellow	Research area	Application of the principles of food science to processing and value addition of locally produced food crops, such as root and tuber crops.	

The youngest of nine children, Faustina Dufie Wireko-Manu is the second member of her family to get a university degree and the first to obtain a PhD. She is the only person from her basic elementary school to earn a doctorate. "Now, one of my goals is to encourage young women that they can make it if they try," says Wireko-Manu.

Wireko-Manu thought long and hard about what discipline to follow. Her brothers pushed her to do medicine because of the course's prestige. "But I was more interested in food science and nutrition, and I have never regretted my decision," she says. "Food is our basic need. Africa will be in serious trouble if we continue to live the way we are now with declining food production, rapidly increasing population, and choosing imported goods over locally produced food. "

Wireko-Manu plans to work on promoting indigenous foods, such as local root and tuber food crops. When she was young, her family would go to her father's farm in the village—and she remembers that they ate food then that isn't often seen anymore. "Indigenous crops are known to be nutritious, but they are going out of usage. For instance, there's a nutritious food called tubani in northern Ghana, but even most locals don't know about it. You make a paste from dried, milled maize and beans, and add cassava and other leaves and spices. I eat tubani in my house, and I want to revive the usage of such healthy, traditional foods and make them attractive to people," says Wireko-Manu.



Wireko-Manu is pleased when she is able to convince people that a certain food is good for them, and they come back to confirm that they like it. "I think people would return to eating indigenous foods, if they knew how to prepare them and how nutritious they are." And she is convinced that part of her mission is to research and teach people just that. She believes that upgrading the traditional processing and preservation of indigenous foods will generate employment opportunities in rural areas.

Wireko-Manu used to spend most of her time in the laboratory, but now teaches food hygiene and sanitation, food chemistry, and food service and management to undergraduate and postgraduate students, and supervises research-based theses. "I also teach sensory evaluation, that is, how human senses are used to evaluate food," she says.

Wireko-Manu heard about the AWARD Fellowship at a workshop organized by the International Institute of Tropical Agriculture, and she is confident that it has come at the right time for her. She is particularly looking forward to the science skills workshop organized by AWARD, with a focus on research proposal writing. "I also plan to compete for an AWARDsponsored research attachment at another institution to further enhance my skills," she says.

"In Ghana Internet access can be challenging, so networking with other AWARD Fellows and my mentor will really help me." Her mentor is in the same line of work, and she is excited to work with her. "People are telling me they believe in me—I have accepted the challenge and I know I will do well."



	Position	Assistant lecturer	
100	Institution	University of Ibadan, Department of Human Nutrition	
	Country	Nigeria	
	PhD:	Human Nutrition, University of Ibadan, 2005	
Shirley Isibhakhomen Ejoh 2011 AWARD Fellow	Mentor:	Veronica Obatolu, Professor of Human Nutrition Institute of Agricultural Research and Training, Ibadan	
2	Research area	Exploring the use of underused traditional plant foods to expand dietary diversity and contribute to nutritional status of vulnerable groups in rural areas.	

Shirley Isibhakhomen Ejoh came from a family that valued education, so it was expected that she would attend university. She chose to study human nutrition, and is currently in a doctoral program in the same discipline at the University of Ibadan.

Ejoh is studying leafy green vegetables, many of which grow wild in and around the village where she is conducting her research. "The food basket in Nigeria is shrinking because of an over-dependence on a few promoted crops," she says. "I want to assess how indigenous plant foods can contribute to the protein and micronutrient intake of women of reproductive age and children, who are the most vulnerable to micronutrient deficiencies."

As part of her research, Ejoh is looking at food frequency patterns of both wild and normal foods among the villagers. She is also working on the processing of flour from cocoyam, an underused tuber in Nigeria. She aims to address some of the constraints in cocoyam consumption and usage by processing the tuber into flour, determining its nutritional qualities, and exploring its potential as a meal or snack item. "My job is more public health rather than agriculture specifically," she says. "The field of human nutrition is vast, and there needs to be a balance between nutrition and agriculture."



Ejoh says her goal is to become a leading researcher and promoter of underused foods and biodiversity for improving food and nutrition security in Nigeria through the development of food-based dietary guidelines, recipe books, and nutrition and health information materials. She hopes to organize a fair on World Food Day, where the women farmers can demonstrate the diversity of the traditional foods in their locality, inviting the university community to attend. She says most of the young people have left the tiny remote village where she works. "We need to document the foods our ancestors ate—and record them on paper, through pictures, and on the web."

Ejoh say she draws the greatest satisfaction from seeing the fruit of her labor. "When I achieve a milestone and the results are positive, it is exciting—it gives you the courage to go on."

As an AWARD Fellow, Ejoh looks forward to working with her mentor and honing her writing skills by attending the AWARD science writing workshop. "I hope to gain leadership skills and I'll apply for an AWARDsponsored research attachment. I know this fellowship will help me become a better teacher."



	Position	Lecturer	
	Institution	Department of Petroleum and Chemical Sciences Tai-Solarin University of Education, Ijebu-Ode	
AND ALL	Country	Nigeria	
	MSc	Biochemistry, University of Ibadan, 2000	
Kehinde Moyib 2010 AWARD Fellow	Mentor	Dr. Samba Thiaw, Director of Research, ISRA, Bambey	
,•	Research area	Development of new genomic resources for marker-assisted selection of agronomically important traits in plants.	

As a research scientist, Kehinde Moyib is committed to using bioinformatics tools to improve molecular breeding in plants. She published the first paper on the genetic diversity of African yam beans (*Sphenostylis stenocarpa Hochst ex A. Rich*), discovering the commonality between this legume and the more common cowpea, and is now fielding questions about her research from scientists around the world.

As the lastborn in a family composed of three sets of twins, Moyib pursued studies in biochemistry after toying with the idea of medical school. "I worked hard, watching other women, and learning from my colleagues," she says. After finishing her BSc in 1997, she got a job with a development agency, which took her to other parts of Nigeria and sparked her interest in learning about other cultures. She worked in a clinic in a remote village where people's only mode of transport is by boat—there are no roads. "I had seen this sort of thing on television, but I never realized that people lived so simply."

After completing her MSc, Moyib began working at the Tai-Solarin University of Education. She enjoys teaching, but she aspires to help rural women and wants to contribute toward ensuring food security in sub-Saharan Africa by 2020. "Like Oliver Twist, I am not content and I want to achieve more," she says. "When you find problems in society, you need to look for solutions. I want to leave a mark, and help people out of poverty. I've been in the lab my whole life. I am anxious to extend to the farm."



Moyib has completed her PhD research and is waiting to defend it. Her goal is to combine the tools of biotechnology and bioinformatics to help improve food security in sub-Saharan Africa. Her first specific objective is to improve molecular breeding in cassava. "Cassava begins to deteriorate within 24 to 48 hours after harvesting," she explains. "If I can help to develop or improve cassava genotypes to eliminate this rapid deterioration, it will mean cassava can be stored longer before processing. This will help farmers immensely, enabling them to generate more income."

Moyib hopes to be a role model for young African scientists, especially women. "The AWARD Fellowship is the greatest thing that has happened to me," she says. "It will expose me to mentoring and networking that will help me to be more focused. I am planning to do post-doctoral work eventually, and feel that the training and contacts I will make here will help to motivate me."



Leveraging partnerships to build the science skills of African women scientists Celebrating eight years of partnership between AWARD and Agropolis Foundation

A.S. ( ) ( )	Position	PhD student	
000	Institution	Sokoine University of Agriculture, Tanzania	
	Country	Rwanda	
	MSc	Human Nutrition, University of KwaZulu-Natal, South Africa, 2005	
<b>Christine</b> <b>Mukantawali</b> 2010 AWARD Fellow	Mentor	Dr. Hilda Vasanthakalaam, Head Food Science and Technology Department, Faculty of Science Kigali Institute of Science and Technology (KIST)	
,	Research area	Fruit processing, focused on pineapple processing and preservation.	

A focused researcher, Christine Mukantwali knows exactly what she wants to accomplish in her career: to develop improved processing methods for locally grown fruits and vegetables to help Rwandese improve their nutritional levels and their livelihoods.

Mukantwali is determined to make a contribution to her country, even if it means studying for her PhD in Tanzania, where she is currently based, far from her husband and three daughters at home in Rwanda. She understands how precious time can be. In 1994, Mukantwali's parents and five of her siblings died in the genocide that claimed more than a million lives. Only she and her younger brother survived.

"I walked the streets, looking for food and clothing. I'd never looked after myself and now I had to look after my brother and my two cousins," says Mukantwali. Despair was not an option. "We survived. As long as I am living, I have to live well."

To support her family and to save money for her university studies, Mukantwali worked as a lab technician at the National University of Rwanda's medical laboratory for several months. She was convinced that education was the way out of poverty. "One day a woman walked by me, carrying water on her head, a baby strapped to her back, with a goat tied to a rope beside her," she recalls. "I realized I'd have to study hard if I wanted a different life myself."



In 2001, Mukantwali won a government scholarship to study nutrition at the University of KwaZulu-Natal in South Africa, where she completed her bachelor's and later her master's degrees in Nutrition. She joined the Institut des Sciences Agronomiques du Rwanda full time in 2005, and worked her way up to be Head of the Postharvest Research Unit and the Food Conservation and Nutrition program. While there, she coordinated a project funded by the Bill & Melinda Gates Foundation on the assessment of postharvest losses of fruits and vegetables in Africa and South Asia, in collaboration with the National University of Rwanda and KIST.

Mukantwali obtained a European Union grant to help small banana wine companies in Rwanda to improve their production. "Hygiene was a problem. The workers were using their feet to mash the bananas," she says. "We taught them good manufacturing processes—pasteurization and juice extraction—and their sales doubled."

Currently, Mukantwali is particularly interested in micronutrients and how they affect the whole life cycle. "Traditionally, Rwandans don't eat a lot of fruits and vegetables, and I want to find ways to encourage people to add these items to their diet." She says postharvest handling needs to be improved, and she is researching this as part of her PhD studies.

To obtain future funding for her research, Mukantwali would like to strengthen her writing skills through training offered by AWARD. "When I've written a successful proposal that will directly benefit people, I feel like I'm flying. Often, I write proposals with a team, and if I can improve my skills, it will help my colleagues as well."

Mukantwali also looks forward to feedback and encouragement from her mentor. "I expect that AWARD will help me to focus and not be deterred when someone says, 'Is that really feasible?'"

Confident and industrious, Mukantwali credits her "can do" attitude to her late parents. "My parents were not educated, but they worked hard and taught their children to do the same," she says. "This is the legacy they left us." Leveraging partnerships to build the science skills of African women scientists Celebrating eight years of partnership between AWARD and Agropolis Foundation

	Position	PhD research fellow	
	Institution	Makerere University/International Maize and Wheat Improvement Center	
	Country	Kenya	
	MSc	Agronomy, Egerton University, 2008	
Shelmith Munyiri 2010 AWARD Fellow	Mentor	Dr. Jane Ininda, Program officer Crop Improvement and Farmer Variety Adoption Fund for the Improvement and Adoption of African Crops Alliance for a Green Revolution in Africa	
	Research area	Genetic studies of resistance in maize to stem borers.	

Shelmith Munyiri has a heart for female farmers in Kenya, many of whom are widows struggling to hang on to their small plots of land—women just like her mother.

Munyiri lost her father in a road accident when she was five years old, leaving her mother to raise five young children. "My mother's only resource was her farm. She did everything she could to get us an education by selling produce," recalls Munyiri. "Today, I work with so many women farmers like her. They have no one to advise them on how to improve their crops or their livelihoods. I want to be a bridge for those women."

Female farmers grow most of the country's home-consumed maize—a crop that is vulnerable to insects. "The maize stem borer accounts for about 13 percent of grain yield loss, and depending on the variety of maize, losses can be higher," says Munyiri, who is studying genetic resistance in maize to stem borers as part of her PhD research at Makerere University. "Most farmers, and especially women, can't afford chemical control, and it is environmentally unsafe."

Munyiri derives her greatest professional satisfaction from helping women farmers directly. "When I was working in extension, women would often tell me what a difference I'd made to them. They'd say, 'If you hadn't taught me to raise papaya, maize, or mangoes, I couldn't have paid my children's



school fees', " recalls Munyiri. "My 20-year experience in extension helps me focus my breeding work on the needs of women farmers. I see this as a real advantage," she adds.

Munyiri has clear career aspirations. As an AWARD Fellow, she hopes to develop her technical skills and her leadership abilities to prepare her to become the head of a regional plant-breeding program. "In about 10 years, I want to have released new varieties specifically responding to women's needs. I want to be on my way to becoming a professor in plant breeding, influencing seed policies in the East Africa region—if not Africa-wide."



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	Position	Research assistant, Socio-economic Research Studies Center	
	Institution	Agricultural Research Institute of Mozambique (IIAM)	
	Country	Mozambique	
	MSc	Agricultural Economics, Michigan State University, 2009	
<b>Alda Tomo</b> 2010 AWARD Fellow	Mentor	Dr. Rafael Uaiene, Agro-economist, IIAM	
	Research area	Analysis of adoption of I-2 vaccine in the control of Newcastle disease in Mozambique, and research in gender and market issues for adoption of common bean varieties and bean seed system analysis.	

Alda Tomo is engaged in researching a range of agriculture-related socioeconomic topics, such as evaluating technology adoption and assessing program impact—considering the changing political, social, economic, and environmental contexts. She is also involved in the analyses of financial and economic profitability of alternative technologies. "Socio-economic research in agriculture is needed to complement conventional biophysical research, so we can increase the efficiency and effectiveness of public investment in research oriented toward poverty reduction," she says.

As a socio-economic researcher, Tomo wants to have a positive impact on the production of food and technology in Mozambique. "I work closely with other scientists to determine when to release a certain technology. We go to the field to conduct diagnostic research to establish needs and to discover whether policy or research interventions are called for." She participated in a team that ran training sessions for farmers on many issues, including conservation agriculture, water and natural resources management, post-harvest food processing and conservation, and market access.

The first person in her extended family to attend university, Tomo has always excelled academically, beginning with winning a city-wide Grade 11 math competition in Maputo. She was invited to attend the International Olympiad in Informatics (IOI) — a prestigious annual computer science competition for high school students—in South Africa in 1997 and in Portugal the following year.



Tomo wrestled with the choice of studying software technology or agronomy. She opted for the latter, and was awarded an AusAID/ Government of Mozambique scholarship for BSc studies in Agronomy at Eduardo Mondlane University. In her third year, she worked as an assistant in the economics section, which shaped her path toward socio-economic research.

Upon graduation in 2005, Tomo joined the IIAM as a research assistant. "Some of the projects I worked on included priority setting in agricultural research and analysis of the financial and economic profitability of cassava technologies," says Tomo.

In 2006, Tomo won a full scholarship from the Michigan State University Food Security Project for her MSc in Agricultural Economics. She returned to the IIAM to continue her research work with local farmers. "I am currently involved in analyzing the adoption of 1-2 vaccine in village poultry production," she says. As the national coordinator of the market group for the Pan-African Alliance for Bean Research in Africa, she is involved in value-chain analysis of common beans. She is particularly interested in gender and market issues for adoption of common bean varieties and bean seed system analysis. Given the increasing concern about climate change, Toma would like to research the socio-economic aspects of climate change adaptation and mitigation measures.

As one of the first researchers in her institute's newly created Socioeconomic Research Studies Center, Tomo wants to enhance her leadership skills. "There are few other experienced agricultural economists in the center who I can learn from to build my career," says Tomo. "AWARD is exposing me to a diversity of experts and other professional women in my research area. It's great to share experiences and find opportunities for cooperation."

Tomo also hopes to increase her visibility among her peers, and looks forward to the AWARD Science Writing, Communication, and Presentation Skills Course. "I want to be heard. I need to learn to articulate—technical skills are not enough if you don't know how to communicate, and this training will help tremendously." Leveraging partnerships to build the science skills of African women scientists Celebrating eight years of partnership between AWARD and Agropolis Foundation

	Position	Senior research officer
	Institution	Kenya Agricultural Research Institute (KARI), National Agricultural Research Laboratories, Nairobi
	Country	Kenya
	PhD:	Agriculture, University of Sydney, 2006
<b>Ruth Amata</b> 2010 AWARD Fellow	Mentor:	Dr. Josephine Songa, Consultant Agricultural Management Systems Kaizen Agricultural Services
,•	Research area	Evaluating technologies to manage maize diseases in Kenya.

As a senior research officer at KARI who manages several critical projects, Ruth Amata wears many different lab coats.

Amata is KARI's project coordinator for BioEarn (Project 2), a Swedish government-funded project in East Africa with a network of collaborators and partners in Ethiopia, Kenya, Tanzania, and Uganda. This project examines the distribution of viral diseases that contribute greatly to yield loss in cassava and sweet potato crops, disease transmission studies (vectors), and disease epidemiology.

"We visited sweet potato and cassava farmers and collected and characterized Kenyan germplasm for resistance to viral diseases," says Amata. "We also characterized sweet potato germplasm for high dry matter content, which is desirable to consumers."

Amata is also a collaborator on a USAID-funded project team developing and evaluating integrated pest- management technologies to control diseases affecting passion fruit. She also coordinates a project that addresses biosafety issues of new varieties before introduction in Kenya.

"Pest resistance and drought tolerance would lead to increased crop productivity and contribute to food security and sufficiency," explains Amata. "However, concerns have been raised about the safety of some products. We are studying potential interactions between transgenic and non-transgenic plants and their impact on the environment."



Amata is in charge of the mycology laboratory, which handles all diseases attributed to fungi, at the National Agricultural Research Laboratories' Plant Pathology Department. Farmers can bring in diseased plant samples and get advice from Amata on appropriate control measures.

"I love to see plants thrive," Amata says. "My main goal is to help women farmers to improve production of their food crops through better disease management. If I can help to reduce the yield loss, I feel that I have done something; that I have contributed positively to somebody else's life."

Amata recalls working with women farmers who were caring for their orphaned grandchildren—children whose parents had died of HIV/AIDS. "These women banded together to purchase a piece of land so they could grow sweet potatoes to feed the children when they came home from school for lunch," explains Amata. "When I do my work, I think of them—and of other women who are struggling to help their families and communities. These women are the solution to hunger and poverty; they can, in time, drive economic development across the continent."

Through AWARD, Amata says she looks forward to building her professional networks. "This fellowship will help me link up with and learn from other women scientists who are making an impact. AWARD's Women's Leadership and Management course is particularly important to me, as it will enable me to manage my projects efficiently and guide upcoming junior scientists."

Amata wants to encourage female students to consider a career in agricultural science. "When I talk to young women, I tell them they can make it, but I also tell them that sacrifices may be necessary. In my case, I studied for my doctorate in Australia—and for four years I was more than 12,000 kilometers away from my husband and two children. I've learned the importance of perseverance, and that nothing is impossible just because you are a woman."

	Position	Senior Lecturer	
	Institution	Department of Food Science and Technology, Bowen University, Iwo, Nigeria	
	Country	Nigeria	
	PhD	Food Technology, University of Ibadan, Nigeria	
<b>Bolanle Otegbayo</b> 2009 AWARD Fellow	Mentor	Prof. Omueti Deborah Olusola Director, Nutrition, Nigeria Heart Foundation	
,•	Research area	Determining the food quality and industrial potential of Nigerian yams to contribute to the expansion and diversification of their use.	

Dr. Bolanle Otegbayo has a yen for yams. This researcher is determined to help farmers capitalize on "the king of crops" as Dioscorea is known in her native Nigeria, which produces 68 percent of the world's yam harvest (50 million tonnes).

Yams are more than a mere tuber to Nigerians, says Otegbayo. "Yams are intimately linked to our economic, social, and cultural life. For instance, a man must give yams as part of a bride's dowry. And no ceremony is complete without a dish of pounded yams. Every farmer grows them," explains Otegbayo, a lecturer at Bowen University in Nigeria.

Yam is the second most important root/tuber crop in Africa with production reaching just under one third the level of cassava. More than 95 percent (2.8 million ha) of the current global area under yam cultivation is in sub-Saharan Africa, where mean gross yields are 10 t/ha. Yams are consumed by 60 million people daily in Africa alone, but production of this traditional crop is threatened. "Farmers are investing their small capital, but they aren't making a profit because they can't get their produce to market before its spoils," says Otegbayo. "They can lose up to 30 or even 40 percent of their yam crops annually because they lack storage. We could be commercially producing and processing yams for export, but so little of that is happening."



Otegbayo wants to break that unprofitable cycle by developing new yam products. "My current research is focused on determining the food quality and industrial potential of Nigerian yams that will contribute to expansion and diversification of their use," she explains.

"I'm looking at how to make yam starch that could be used as a commercial thickener. I want to determine the molecular composition of yam starches and understand their functional properties. I believe this will have a lasting impact on the nutritional and food security status in my country."

In her university lab in Nigeria, Otegbayo lacked the equipment needed to investigate yam starches properly. She hoped to obtain a research grant to purchase equipment, but winning such funding is rare in developing countries. As an AWARD Fellow, she competed for a research attachment and won a three-month placement with the Food Technology Department at Centre de coopération internationale en recherche agronomique pour le développement (CIRAD) in Montpellier, France, which was funded by Agropolis Fondation.

Otegbayo was the first AWARD Fellow—and the first Nigerian—in the program, working under the supervision of Dr. Olivier Gibert. "Bolanle contributed greatly to CIRAD as one of the world's leading scientists in yam and cassava research," he says. "She shared her networks and linked us to food researchers across Africa. We have profited from her presence."

With her research team in Nigeria, Otegbayo has characterized in detail 45 varieties of yam from five common species. This is the first characterization of a large variety of yams, which will serve as baseline data for future research and for selecting yam genotypes for specific end uses. Research has not yet been able to determine the molecular composition of yam starches. However, during advanced science training at CIRAD and the University of Nantes, France, Otegbayo carried out further analyses of the yam samples, leading to better understanding of the functional properties important for determining the industrial potential of yam starches.

Otegbayo recently became a Certified Food Scientist with the International Food Science Certification Commission. She wants to share the experience and knowledge that she gained through AWARD with junior colleagues, and has volunteered as an AWARD Mentor. "My vision is to be a transformational, inspirational leader—a goal setter, an achiever, and a builder of lives, who is worthy of emulation," reflects Otebayo.





African Women in Agricultural Research and Development (AWARD) works toward inclusive, agriculture-driven prosperity for the African continent by strengthening the production and dissemination of more gender-responsive agricultural research and innovation. We invest in African scientists, research institutions, and agribusinesses so that they can deliver agricultural innovations that better respond to the needs and priorities of a diversity of women and men across Africa's agricultural value chains.

Since 2008, AWARD has, through individually tailored two-year fellowships, worked to strengthen the research and leadership skills of African women in agricultural science, empowering them to contribute more effectively to alleviating poverty and increasing food security in sub-Saharan Africa.

Hosted by the World Agroforestry Centre United Nations Avenue, Gigiri P.O. Box 30677-00100 Nairobi, Kenya

+254 (0) 20 722 4141

EMAIL awardqueries@cgiar.org www.awardfellowships.org