



2009 AWARD Fellow Stella Asuming-Brempong

Research area: Sustainable build-up of soil nitrogen and phosphorus in an upland rice-based cropping system through the use of leguminous crops and phosphate solubilising microorganisms.

As a soil scientist, Stella Asuming-Brempong is focused on empowering rural smallholders to improve their soil fertility practices for higher crop productivity, while sustainably building up soil phosphorus status.

She is studying nutrient problems in some of the soils in rice-growing regions in Ghana. Upland rice varieties, such as Nerica rice which is grown in many areas in Ghana, can yield 1.5-2.5 tons per hectare without inputs. This amounts to high uptake of N, P, and K every growing season from the already nutrient-depleted soil. Analysis of soils in the savannas showed that the nutrient status regarding N, P, and soil organic matter was declining, particularly in upland rice cropping systems.

"I have isolated some phosphate solubilizing microorganisms (PSMs)—mainly bacteria, fungi, and actinomycetes—from some Ghanaian soils. In pot experiments, some of the PSMs were used to improve growth of Nerica rice. We found that they significantly influenced rice yield, as well as nitrogen and phosphorus uptake of the rice," says Asuming-Brempong. "Molecular characterization by amplifying the presence of the *nifH* (nitrogen fixation genes) and the *pqq* genes (genes that produce cofactors involved in secreting gluconic acid) are yet to be done so that I can screen for PSMs with nitrogen-fixing and gluconic acid producing-abilities. Such desirable PSMs will be used to grow rice in field experiments."

As a master's student at the University of the Philippines at Los Banos, while also serving as a research scholar at the International Rice Research Institute's Soil Microbiology Department, Asuming-Brempong examined the effect of temperature and phosphorus on *Anabaena*-free azolla and symbiotic azolla strains. Later, while working at the Agricultural Research Centre at Kpong, Ghana, she conducted a major study in collaboration with the West Africa Rice Development Association to investigate the feasibility of using azolla as a green manure in the Accra Plains.

Position: Senior research fellow

Institution: Soil Science Department, University of Ghana, Legon

Country: Ghana

PhD: Soil Microbiology, Michigan State University 1999

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"Fresh azolla is used as a green manure to increase crop yield, but no use has been reported so far of dry azolla, especially in Ghana," says Asuming-Brempong. "Realizing that dry azolla has a lower nitrogen mineralization rate, I made pelleted azolla fertilizer by adding a little urea to prime the mineralization process. The pellet form can easily be broadcast in the farms with little risk and it stores well at room temperature. The pelleted azolla fertilizer will supply some of the nitrogen requirements of crops, and farmers will save money."

Asuming-Brempong has published in national, regional, and international journals, including *Soil Biology and Biochemistry (Elsevier)*, *Soil Ecology*, and *the West African Journal of Applied Ecology*, and has presented her research at forums in Australia, Canada, and the U.S. However, she would like to publish more of her research findings and she says AWARD is helping her to achieve that goal. "After attending an AWARD science-writing course, I am ready to publish one scientific paper and am preparing two others," she says.

Asuming-Brempong believes that women scientists need encouragement and support, especially after being in the workforce for some time. "Women face many challenges that can easily disillusion them as they grow older. They can lose their focus and feel disoriented, which kills their aspirations and scientific potential," she says. "AWARD gives me the opportunity to meet other African women scientists and share knowledge and ideas. It offers me hope at this time in my life and is helping me sharpen my research skills."

With renewed professional vigor, Asuming-Brempong applied for and won an AWARD-sponsored research attachment with Dow AgroSciences in Indianapolis, Indiana in 2011. She was also recently elected as a fellow in the prestigious, London-based Society of Biology, an international organization with 80,000 members worldwide.

Asuming-Brempong is one of 180 African woman scientists who have won an AWARD Fellowship. AWARD is a professional development program that strengthens the research and leadership skills of African women in agricultural science, empowering them to contribute more effectively to poverty alleviation and food security in sub-Saharan Africa. For more information, visit www.awardfellowships.org
