Improving Soil Fertility Management in Northern Ghana

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In Ghana, as in many countries in Sub-Saharan Africa, poor soil fertility is a major cause of hunger and malnutrition. Therefore, improving soil fertility is key to improving human health and well-being. Through my dissertation research, I am collaborating with smallholder farmers and scientists in the Upper West Region of Ghana. We are working together to develop locally-appropriate soil fertility management strategies.

As scientists, we are aware of fundamental physical and biological processes that influence food production. Similarly, farmers possess vital experiential knowledge of their livelihood systems that we, as outsiders, lack. Both perspectives are essential to identifying and implementing environmentally and socio-economically viable farming practices. With that in mind, this summer we established two researcher-managed experiments and one on-farm experiment managed by local farmers.

The researcher-managed experiments are being conducted in partnership with the Savanna Agricultural Research Institute (SARI), an agency of the Ghanaian government. Both experiments focus on characterizing pigeon pea growth and development under local climatic conditions. The results will provide important information for advising farmers on how best to grow pigeon pea in the Upper West Region. Unlike typical "on-station" experiments, which utilize large amounts of irrigation and fertilizer, we tried to approximate farmer conditions as much as possible. Initially it seemed sporadic rainfall early in the season would ruin the experiments. The experience gave me an increased appreciation for the farmers' concern about the shortage of rain.

In the on-farm experiment, farmers, SARI scientists, and I are collaborating to determine the effects of integrated nutrient management (a combination of crop rotation and fertilizer use) on soil fertility. This year we planted three crop species: maize, peanut, and pigeon pea. Next year, all plots will be planted with maize to determine the effects of the previous crop. Small amounts of phosphorus and nitrogen fertilizers will also be applied to evaluate the combined effect of crop rotation and fertilization. Though previous on-farm trials in the area have generally involved between six and eight farmers, a record 15 farmers are participating this year. Farmers expressed genuine interest in the research; especially with respect to how pigeon pea might fit into their farming system. I look forward to our continuing work together.

Phillip D. Alderman is a doctoral student in Agronomy. His research was funded in part through the USAID Peanut Collaborative Research Support Program (CRSP). He was a CAS FLAS Fellow in 2006-07 and 2007-08 for Akan.