**Sustainable Agriculture and Natural Resource Management**
**Collaborative Research Support Program**

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# Trip Report: Ghana and Mali

8 – 24 October 2010

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**Purpose of Trip:** Visit SANREM field tests on CAPS established in Ghana and in Mali.

**Sites Visited**: *Ghana*: Busa, Nyoli, Bu and Brutu; and
*Mali*: Sotuba, Sikasso, Mopti and Cinzana

## Description of Activities

*Ghana: (8 – 12 October, 2010)*
Dr. Pierzynski, Dean of Agriculture, K-State and member of SANREM Board of Directors visited selected SANREM sites along with Dr. Prasad (PI, US) and Dr. Naab (PI, Ghana). A SANREM participants meeting at Savanna Agricultural Research Institute was held to describe on-going research and training activities and set the agenda. This was followed by a field visit to a mother-trial in the village Busa, where impact of tillage (conventional tillage and reduced tillage), cropping systems (continuous maize and soybean – maize rotation) and three fertilizer rates are being tested (Photo 1). Farmers were excited to participate in the project and curious to know the impact of rotation on final yields. Soybean and maize crops had good growth, farmers were expecting good yield.

A farmer field day was conducted at Nyoli site, where farmers from the nearby villages were invited to look at the mother trials and few baby trials in the farmers' fields (Photo 2). The component of conservation agricultural practices (CAPS) being tested in this village included different tillage systems (conventional and reduced tillage), different cropping systems (continuous maize or soybean – maize rotation) and residue management (different levels of residues).

There were about 45 participants (Photo 3) and all were excited to see crop growth under reduced tillage plots, which was similar to crop growth in conventional tillage. There was active participation from both women and men farmers. SANREM farmers explained the potential savings from fuel and cost of renting tractor. However, they also acknowledged the need for improved weed management and labor involved for weeding. They discussed the opportunities

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for using herbicides. All SANREM farmers shared their experiences and exchanged knowledge (Photo 4).

Farmers liked active discussions and extended the invitation to others farmers in region to come to their villages and also share knowledge with other farmers. The second field day (Photo 5) was organized in the north of Ghana in Nandom region where the participating NGO is LACERD (Langmaal Center for Rural Development Initiatives). We visited mother trials and baby trials in the villages of Brutu and Bu in the region. The major components of the mother trial in this region were tillage (minimum tillage) and water conservation techniques (use of tied ridges, grass strips and strips of pigeon pea). We also visited the fields of two women farmers who were conducting baby tests on tied ridges and pigeon pea strips for water conservation and legume (Photo 6).

In a few farmers' fields the establishment of grass strips was not good due to lack of rains. The farmers were not aware or sure of the grass species used and requested more information from the NGOs and scientists. There were discussions about the direction in which the grass strips should be planted. Farmers acknowledged the need for surveying their lands and determining the slopes before deciding on the planting techniques. In addition, there were questions about the density and number of rows of the strip crops and alternative uses of the selected crop. The growth of the pigeon pea was good. The pigeon pea genotype used was photoperiod sensitive and did not flower. However, there are other genotypes which are early and can produce pods. More research is needed for determining the best genotypes of pigeon pea for the region based on the need of the farmers and available inputs. The challenge in minimum tillage was weed control which consumed labor. Pigeon pea growth was good and was producing a lot of biomass.

*Mali: (17 – 24 October)*
Dr. Pierzynski returned back US after visiting Ghana followed by Burkina Faso, and Dr. Prasad continued his visit in West Africa (Burkina and Niger) and reached Mali on 17 Oct. Along with Drs. Doumbia (PI, Mali) and Kone (Co-PI, Mali) and field assistant Omar, Dr. Prasad visited the on-station and on-farm experiments in Sotuba, Sikasso, Mopti and Cinzana.

The first day we visited experiments of EMBRAPA – Brazil on CAPS – these included use of various cover crops (both legumes and grasses) on cotton and maize rotations systems (Photo 7). These were established two years ago and would be a potential opportunity to learn. These are large fenced experiments where crop residue was also being managed. The scientists were interested in sharing the knowledge and continuing collaboration.

The second day we travelled to Sikasso and visited the acting director of the station and followed to visit SANREM fields at Farako location. These sites were testing the influence of tillage, fertilizers and ridging on maize (Photo 8). There was clear influence of fertilizers on productivity of maize. However, the differences in various tillage treatments were not visually clear. The second sited visited was in Finkolo, where the influence of rotations of maize and peanut along with different fertilizer treatments were being tested (Photo 9). The fertilized maize was visually very good; however, in the peanut fields the difference was not that visually clear.

Peanut is an important crop in the region and particularly grown by the women farmers. It has good potential to fix nitrogen and help the following maize crop. In addition, peanut can also fetch good yields in these soils and have higher market price. The peanut hay is used as animal feed, so there may be some conflict with the residue management. Farmers need to be educated about the long term benefits.

The third day we continued our trip to visit some of the farmers' field in the nearby village of Noyaradogou, where the influence of fertilizer and residue management was being tested on maize and peanut cropping systems. The influence of fertilizer practices was dominant. The no fertilizer and farmers' fertilizer practice produced very small ears which were poorly filled (Photo 10). Some farmers were aware of the benefits of fertilizer, but had limited economic resources and credit to purchase the fertilizer in time. Peanut fields were harvested and hay was stored at the corner of the fields. However, we have to see how much of this hay will be left before the next planting season.

We continued our journey to another village Omarbougou in the Koulikoro region. The main components of research in this region were influence of contour ridging and fertilizer in sorghum and peanut crop rotation systems compared to farmers' practice of no rotation, no fertilizer and ridges. The growth and yield from the farmers practice were very low in peanut (Photo 11) and sorghum. These dramatic effects were also due to untimely weed control and excess rainfall this year which caused delayed harvest. This year there very high rainfall during the maturity, some villages were completed submerged by water and lost their homes and most of the crops. This was observed on our drive from Sikasso to Mopti. We visited our INTSORMIL sorghum experiments in Mopti. We did not have time to visit the SANREM plots due to time constraints. SANREM field assistant and Dr. Kone had the opportunity to visit our sorghum plots in the decrue (sorghum planted in receding water from the lakes) production systems. The main objectives of these experiments were to compare the performance of various genotypes in the decrue region. After Mopti, we continued our travel to Cinzana where we visited two farmers' fields (baby sites) who were testing influence of millet – cowpea or peanut systems along with tied ridges (Photo 12). Use of tied ridges and fertilizer practice had better growth.

Use of legume (either cowpea or peanut) as intercrop or in rotation can help improve soil quality and nutritional status (Photo 13). Farmers were happy with the performance of both millet and peanut in the intercropping system (Photo 14). They were aware of the benefits of legume in providing nutrition to the cereal crop in the same or following season.

**Suggestions/Recommendations and Follow-up:**

We need to continue to monitor the research of EMBRAPA research plots in Sotuba so that we can learn from them and determine which species of legume or grass species has the potential as a cover crop in the region. It is also essential to continue to work with NGOs to train the farmers on crop reside management. We need to also discuss the possibility or need to protect the on-station experiments from the cattle by constructing fences. We need to put sign boards for the experiments providing details of treatment. We need to follow up with USAID – Mali Mission and continue to brief them about our activities in the region and broader impacts related to farm productivity and mitigation of climate change.

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