

# Partnering for Success: A Peanut CRSP Project in Ghana West Africa

I. Adona, J. Ada-Mensah, J. V. K. Afari, V. M. Achehinah, F. O. Aono-Nyako, G. Boffroy-Arku, M. A. A. Dantyi, J. Lamptey, M. B. Mochiah, E. Moses, K. Osei, S. Osei-Yeboah, Oususu-Akyew, J. K. Twumasi, and- CSIR-Crops Research Institute, P.O. Box 3785, Kumasi, Ghana; R. L. Brandenburg and D. L. Jordan - Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613; M. Abdulai, S. K. Nantsoah, and A. B. Saffo - Savanna Agricultural Research Institute, P.O. Box 52, Nyankpala, Tamale, Ghana; H. Azot - Ejura-Sekyedumase District, Ministry of Food and Agriculture, Ghana; I. K. Dzonsoku - University for Development Studies, P.O. Box 1356, Tamale, Ghana, West Africa.; C. Oti-Boateng - Ministry of Food and Agriculture, P.O. Box AH 9351, Ashanti, Kumasi, Ghana.

The success and impact of the Peanut CRSP collaboration between the Departments of Entomology and Crop Science at North Carolina State University and the Crop Research Institute (CRI) in Kumasi, Ghana and the Savanna Agricultural Research Institute (SARI) in Tamale, Ghana has been well documented in more than 20 refereed journal articles, extension programming, and outreach. Documented increases in production acreage as well as increased yields by growers in Ghana are also the result of Peanut CRSP sponsored research. Funding of the Peanut CRSP project NC-19, "Improved Production Efficiency Through Standardization, Integrated, and Enhanced Research Technology" has provided considerable economic impact and scientific merit to the host country, Ghana. N. C. State University and the associated U. S. peanut industry.

Groundnut (*Arachis hypogaea* L.) is a very important food and cash crop in the northern savannah zone of Ghana. It is used extensively as oil and paste and for confectionary purposes. The area planted to groundnut in 2003 was 464,710 ha. The northern sector (Northern, Upper West and Upper East Regions) produces 91.4% of national production. The current production is 439,030 MT



A pilot program was established in a village in Ejura to involve 30 farmers in the research and technology transfer of new Peanut CRSP research findings. These farmers met with CRI researchers every two weeks at the research plots for training and observations of the various production methods. At the end of 3 years, each farmer was presented a certificate of participation, and these farmers are now involved in training other farmers. The result of this research and training approach has resulted in a dramatic increase in production, a doubling of yield, and a significant impact on individual and village finances (one farmer purchased a car and another bought a house).



Farmer Field School

## Aflatoxin

Research on groundnut aflatoxin problem has been limited because of a lack of awareness of the aflatoxin problem, trained personnel and facilities for aflatoxin analysis. Limited studies carried out in 2001 indicated some appreciable levels of aflatoxins in groundnut samples in the North (SARI, 2002).

Kernel damage, moldiness and aflatoxin contamination of the kernels during storage is a major problem facing the groundnut industry in Ghana, especially in the more humid areas (Awuah & Kpodo, 1996). Aflatoxin surveys conducted in 1993 revealed high levels of aflatoxins (5.7 to 22,168 µg/kg) in damaged kernels of groundnut samples from various regions of the country (Kpodo, 1995).

- Groundnut samples collected from the Northern Region yielded high levels of *A. flavus*.
- Aflatoxin levels ranging from 0.4 to 47.5 ppb were quantified in the kernel samples collected in the north of Ghana.
- Contamination of groundnut by aflatoxins is undesirable because these compounds constitute a serious health hazard to humans and livestock alike.
- The extent of contamination of stored groundnut by the aflatoxigenic *A. flavus* in northern Ghana and aflatoxin levels of contaminated kernels largely remain unknown.

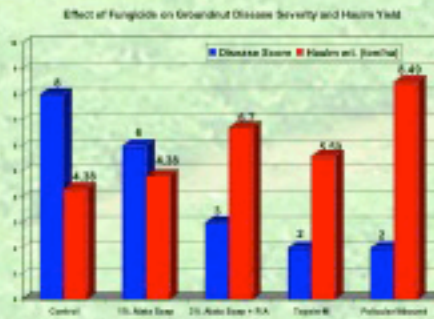
Surveys taken in the Ashanti Region of Ghana were conducted in a district where farmer schools were initiated by collaboration among scientists and practitioners from Ghana and the United States. Results from the survey of growers and components of the peanut farmer schools indicated that performing germination tests prior to planting and planting peanut in rows were practices adopted most by peanut farmers attending formal farmer schools. Surveys also suggest that soil fertility and lack of host-plant resistance and disease-control practices are yield limiting in the region. Results from these surveys and discussions in farmer schools are used to target production and pest management practices that can be improved through research and education efforts to improve peanut production and the well being of farmers in the district.

## Disease Management

Farmer survey results on foliar disease:

- 82% of farmers did not use a control measure for disease
- 13% removed diseased plants
- 4% sprayed a local soap or synthetic fungicide

Results on the use of soap



## Weed Management

Weed management was another major concern in parts of Ghana. Difficulty weeding, interference with peanut, rapid growth, and profuse seeding were reasons certain weeds were of greatest concern. Also, weed management is time consuming and labor intensive.



## Plant Spacing

Perception of weed control effectiveness by peanut farmers in southern Ghana.

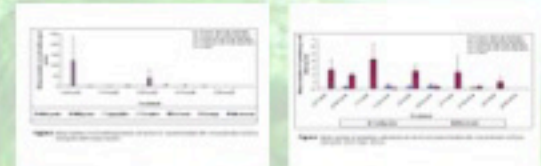
Common name	Weed control		
	Good	Fair	Poor
Butterfly pea	0	30	30
Cogon grass	15	15	74
Jamaican crabgrass	0	0	100
Purple rudbeckia	0	100	0
Slam weed	0	100	0
Wild parrotella	0	33	67

Influence of land preparation on farmer's perception of weed control in southern Ghana.

Weed control effectiveness	Land preparation system			
	Shovel tilled flat	Stalk and herb flat	Stalk, herb, and raised ridge	Stalk, herb, and mound
Four	49	58	108	58
Fair	28	28	9	28
Good	28	9	9	25

## Insect Management

Soil arthropod pests observed in peanut fields during all years across all regions were white grubs, millipedes, symphylids, termites, earwigs, wireworms, red ants, and mealybugs. Black ants and centipedes were predatory arthropods found in these fields. Termite was the predominant arthropod in all the regions. Black ants were the predominant predatory arthropod. Although percentages of unfilled pods were high in all the regions during all years, damage caused by soil arthropods was relatively low.



2002 Konkoma and Ejura peanut damage and yield comparison of the cultivars Konkoma and ICG FDRS-20 X F-MIX-38 treated with carbofuran or chlorpyrifos.

Low populations of soil arthropods were observed at both Kwadaso and Ejura regardless of insecticide treatment. Chlorpyrifos was more effective than carbofuran in enhancing yield. A single application of chlorpyrifos applied at planting was as effective as a single application at planting followed by a second application 60 days after planting. Yield of ICG FDRS-20 X F-MIX-38 was generally higher than the local cultivar Konkoma regardless of insecticide treatment.

## Impacts

Impact Made as a Result of Peanut CRSP

Indicator	Percentage of farmers observing changes			
	Increased	Same	Decreased	Unknown
Area planted	37	28	18	1
Yield	56	19	23	2
Quantity consumed	54	32	23	0
Quantity sold	64	18	20	0
Income	67	12	21	0

Changes in peanut production and consumption observed by farmers after attending farmer field schools.

Descriptive statistics for the survey of ninety peanut farmers in the Ejura-Sekyedumase district of Ashanti region in Ghana, West Africa.

Sources of information farmers used to adopt the practice of testing seed germination prior to planting peanut. Sources of information farmers used to adopt the practice of planting peanut in rows.

Sources of information	Percent of farmers	Sources of information	Percentage of farmers
Farmer schools	57	Farmer schools	48
Other farmers	21	Other farmers	35
Extension and research scientist	55	Extension and research scientist	28
Radio	7	Radio	5

Indicator	Percentage of farmers observing changes			
	Increased	Same	Decreased	Unknown
Area planted	37	28	18	1
Yield	56	19	23	2
Quantity consumed	54	32	23	0
Quantity sold	64	18	20	0
Income	67	12	21	0

Changes in peanut production and consumption observed by farmers after attending farmer field schools.

