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TRIP REPORT FOR SENEGAL
Peanut CRSPP
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(Accompanied by Gerald Wheelock)

We arrived in Dakar at approximately 0700 25 January, 1981. A UAAID Driver met us at the airport and took us to USAID headquarters. We met briefly with Mr. John Balis, Food and Agriculture Officer. We made arrangements for a visit to the ISRA Station at Bambey and to an Experimental Unit near Kaolack. The USAID cars were not available due to a Regional Directors meeting. Dr. Claude Charreau's ICRISAT Office kindly provided us a car for travel.

In the afternoon we returned to Mr. Balis' office and had a short discussion with him. There are only about 43 agricultural scientists in Senegal. The French are gradually pulling out of the country in many areas, since they are beginning to question the value of or the payoff from the $140 million annual investment. A recent change in the Senegalese government is also creating a desire to obtain assistance from other countries, which should be favorable for the CRSP. It will be hard for the U. S. to work in French countries because of language, research style and the general lack of transfer of research data to farmers. It will be hard to construct a research program that would easily translate to the farmer.

There is normally about 1.2 million tons of peanuts produced in Senegal annually. About half of these are exported partly for oil and some as whole nuts. The rest is consumed locally as oil and directly. Drought reduced total yields to about 500,000 tons in 1980 (average yields down about 50% to 500 kg/ha).

The marketing system is being reorganized and is not presently functioning. There is a question by the farmers as to how much they owe the COOP's for seed and fertilizer. The farmer feels he is being overcharged.

Most of the peanuts are grown north of Gambia in the western half of the country. Rainfall averages from 900 mm in the south to 400-500 mm in the north part of this area, and falls from June to October in the very south of Senegal and from July to September in the north. Therefore longer seasons peanuts are grown to the south and shorter season varieties to the north. Fertilizer usage is limited in the north due to low response in the dryer area. More could be used to advantage than presently is in the south. Fertilizer could move rather cheaply if corruption did not push prices up. Trained animals and tools are in relatively short supply for agriculture.

Other USAID officers met were Barbara Scapa and Lance Jepson. Points made by Mr. Jepson and a summary meeting with Mr. Balis will be discussed later.

A visit to IDRC was made. An appointment for Thursday morning was arranged with Mr. Stuart E. Brown, a Social Scientist.

Tuesday, 27 January, 1981.

We left the hotel in Dakar by ICRISAT car and arrived at the ISRA, CNRA Station at Bambey. This is the oldest station in Senegal, begun about 1925. We had a short visit with the Director Dr. M. Mdodj, who expressed interest in a CRSP linkage.

Discussion with Mr. Gautreau, Peanut Physiologist; Dr. dePins, Peanut Breeder; and Dr. Aly Ndiaye, Peanut Physiologist.

Bambey usually receives rain from July 1 to October 15, but in 1980 rain began late and was erratic and deficient. The 90 day varieties produced only about 50% of normal yields on the average.

Rosette has never been too virulent in Senegal, except in the very south where rainfall is higher. The variety 69101 is resistant to rust. Rust was first observed in 1978, and probably will become a major problem. There is a moderate late leafspot problem, and no variety resistance is presently available. There are some aphid problems in the south.

Farm storage of seed is hard because of storage insects. Farmers often sell the seed peanuts to get money during the dry season. Seed will be short in 1981 due to the drought. There is a new national program for seed and fertilizer distibution, which is not yet functional and will compound 1981 problems.

The price paid to the farmer for peanuts is stable at 50 francs/ kg. In turn they sell for 400-800 francs/kg at the oil mill or for whole peanut export. The national buyer sells to the oil factories. Most oilcake is exported to the EEC which limits aflatoxin levels in cake at 50 ppb, and the Senegal cake is seldom under 50 ppb.

The farms generally run from 3-10 ha. in size and 0.5 to 1 ha. of peanuts. Other crops are millet, sorghum and cotton on the more intensive farms. Farmers store their own peanuts in bags or baskets, eat directly, crush for own oil, or sell some to markets. The oilcake from home crushing is either eaten in rice, millet, or maize or fed to animals.

Agronomic studies in the past have included spacing, plowing at end of season to remove weeds for water conservation, and fertilization. Spacings are 40 x 15 Cm in north for 90 day varieites, 50 x 15 cm in central area for 105 day varieites, and 60 x 15 cm in the south for 120 day varieties. 73.33 is a 100 day drought resistant to rosette and used in South Senegal, and GH 119.20 a 110 day variety from Georgia that is well adapted, good for local use and export because of its pleasing taste. Florunner grows well, but is not competitive in yield with local varieties and tends to have small seed.

Experiment Station yields of 2 1/2 - 3 tons/ha compared with 1 ton/ha farm yields point to shortcomings in farm management. Some socioeconomic constraints were: (1) lack of money and incentive to apply good practices, (2) lack of time to perform good practices, and (3) lack of extension service in getting rsults to farmers (in contract the extension service says the researchers are too slow in getting results to them). If farmers would overcome these constraints and use proper fertilizer and seed treatment, plant at the right time, use the proper variety and use high quality seed, they could probably double yields.

It is important to seed on the morning after the first rain during the night. A 20mm rain wets 20 cm of soil and 5 mm are lost on each of the first 3 days by evaporation. It may be 10-15 days until the second rain, therefore timely planting is necessary to take advantage of the maximum length of the growing season. Delayed planting often results in immature seed when the dry season returns.

Farmers are not aware of how to determine harvest maturity and usually harvest by number of days after planting. Sometimes harvest comes after food grain crops are harvested resulting in preharvest field losses through pests and peg breakage. Usually harvests are made too early in maturity.

Constraints to production and utilization listed by Dr. dePins that are objectives of his breeding program were:

1. Lack of rainfall requiring development of drought tolerant varieties.

2. Diseases, primarily rust at this time, leading to breeding tolerant or resistant varieties. Dr. dePins is testing rust resistant material in Upper Volta, because of a greater presence of rust at this time. He can use artificial innoculation in the lab and in the field during dry season under irrigation to minimize spread of the disease.

3. Aflatoxin contamination making resistant varieties desirable. Farmers often press own oil and eat some of the cake cooked in rice or millet. Could educate farmers to select best peanuts for eating to reduce consumption of aflatoxinx. Simple and cheap detoxification procedures are needed. Local research has evaluated Dr. Nixons aflatoxin tolerant lines from Georgia and 2 local varieties (one was 55-437). Varieties were as tolerant as those from Dr. Mixon. Dr. dePins feels aflatoxin resistance will be hard to develop in varieties.

4. There is a need to breed for higher yield potential, and for oil and amino acid content and quality that fit needs better.

Mr. Gautreau's physiology research is aimed toward developing physiological methods to screen for drought tolerance concentrating on physical aspects. He has looked at water use efficiency which is hard to do under field conditions because of variability in weather. Agronomic type trials have developed plant spacings and plowing techniques to conserve water. Plowing and keeping the land weed free during the dry season can conserve up to 50 mm of water.

Dr. Ndiaye recently completed his doctoral program in Paris and will work on biochemical means of identifying drought resistance in peanut lines. He will concentrate on enzymes. Some enzymes increase and others decrease with water stress. Six enzymes were mentioned; acid and alkaline phosphatase, acid and alkaline amalase, catalase, and invertase. Some amino acids increase in drought resistance lines and higher sugar levels tend to protect cells from water loss. Hypotheses developed are hard to confirm in the field due to climatic variability.

Drs. dePins and Ndiaye and Mr. Gautreau cited several ways they felt the CRSP could aid them.

1. Exchange of breeding material.
2. Exchange of methods of selecting for certain characteristics; e.g. aflatoxin resistance, methodology of Mixons; which methods are quicker and more dependable; methods for screening for drought resistance.
3. Availability to precision equipment on a collaborative basis such as Phytotrons, growth chambers, and specialized lab equipment.
4. Aid in minor equipment maintenance an purchase of simple equipment. A greenhouse is needed.
5. Some infrastructures imped research which CRSP would be unable to provide, such as variable electricity and insufficient transformers.

We did not see these following two men on our visit to Kaolack, but they were mentioned to us. Mr. A. Rouziere does some work on peanut technology related to resistance to seed splitting, roasting properties, and storage under vacuum and cold chambers. Mr. H. Masses works in plant protection and screens pesticides for disease and insect control. Millipeds, seedling diseases, and insect damage to pods near maturity are areas of interest.

M'Baye N'Doyle, Head of the Entomology Section and Nohamadon Ly discussed major insect problems with us. Caryedon serratus (Bruchidae) is a major storage insect pest. It has a snout similar to a boll weevil. Both the adult and larve are very damaging to peanuts in storage. The life cycle is about 35 days. The most susceptible time for chemical control is in the 2 day period of egg laying. Alphanus sordidus (lygaeidae) attacks around harvest time on near mature and mature nuts in the field. It punctures the shell and sucks oil from the seed, often greatly lowering oil content (down to 10% at times). Both insects are found only in West Africa from Nigeria to Senegal. Some C. Serratus have been reported in Zaire. C. serratus has become resistant to Lindane. Phosphorous insecticides are being introduced to replace Lindane.

We made a short field tour to see Dr. Duc's irrigation research and to see some peanut increase plots in the irrigated area. Saline toxicity symptoms were evident in low areas of the increase due to high salt content of the water. Dr. Duc's research is comparing a high sodium water (from 300m depth) with a calcareous water (from 20-30 m depth.) Gypsum and crop residue treatments are being used to reduce sodium toxicity. Good results are obtained with gypsum. Farm size units of vegetables are being grown to study the economics of irrigated production. The water is being lifted from a storage tank to a gravity flow tank for trickle irrigation (7m height) by a solar powered pump.

January 28, 1981.

We traveled from Bambey to Kaolack to visit the ISRA Sectour Centre Sud (Research Station). Our primary purpose was to visit a farm village where ordinary and intensive production practices were being compared. Both experimental units grow millet or maize, peanuts, sorghum, and cotton. Our contact who accompanied us on the site visits was Mr. Saliou Niang, Supervisor of the Experimental Units.

Comparative Practices

Intensive	Ordinary
Oxen for power	Oxen, horses, or donkey
Larger equipment	Small equipment
Fertilizer for cereals 100 kg/ha 10-21-21 +100 kg/ha area	150 kg/ha 14-7-7
Fertilizer for peanuts 150 kg/ha 8-18-27	150 kg/ha 8-18-27
Fields adjacent for better labor utilization.	Fields not adjacent
Trees and bushes removed from field.	
Selected Seed	Seed not selected.
Phosphate added that was a gift for clearing field.	No phosphate
Plow after millet or maize for water conservation.	
More manure from cattle.	Less manure from cattle.

Under good rainfall, the intensive farmers have produced 2000 kg /ha peanuts, while the ordinary farmer with same rain and later planting produces 500 kg/ha. The husband and wife and children often work together in food (cereal) production fields and separate in cash or peanut fields. The family may have 1 pair oxen, 2 horses and 1 donkey. Seed and fertilizer come from Coop. 150 kg/ha fertilizer costs 53 kg peanuts (50 franc/kg) and 100 kg seed require 125 kg seed in return. 200 gm seed treatment for 100kg seed costs 100 francs.

The experimental unit farms grow 780 ha peanuts, 66.5 ha cotton, 750.5 ha millet, 148.5 ha maize, and 58.3 ha sorghum. There are 150 families in the unit. In 1979 the intensively produced peanuts averaged 802 kg/ha and the ordinary 493 kg/ha.

The village generally grows millet and maize near the houses to take advantage of manure from the cattle dropping during the dry seson (also for security), and peanuts and cotton further away from the houses.

We went into the housing area of one family and saw among other things peanuts being crushed by mortar and pestle and pressed in a hand screw press. Peanuts were sacked in 70 kg sacks for market. We also visited a coop collection site and saw a large mound of peanuts being held for marketing through national collectors.

29 January, 1980

We visited with Mr. Stuarte Brown in the morning relative to Social Science research evaluating food patterns in villages. Dr. Wheelock should cover this in his report.

Later in the day we returned to USAID and had a final discussion with Mr. Lance H. Jepson and Mr. John Balis.

Mr. Jepson made the following comments relative to agriculture in Senegal, a country with a long history of research.

1. Insects are not a great problem.
2. Technology packages are fairly well developed.
3. Translating research to the farm through demonstrations are not carried out well.
4. Research may be too concentrated at Bambey. There is an USAID and World Bank Project to decentralize the research.
5. Seed production is now turned over to the Coops that have no storage or trucks to transport. ONCAD did deal in buying and developing cereals and peanuts, but has been dissolved. SONAR has seed and fertilizer distribution responsibility, but not purchase and transfer of products.
6. Seed will be bad this year due to the drought, causing unfilled pods and small seed. Farm storage is also poor.
7. Senegal imports 270,000 tons/yr. of rice, which they buy with peanuts sales.
8. Collaboration between research and extension is not good. World Bank is building an agriculture school at Thies for a BA or BS degree to fill a much needed gap. There is no research planned for student training. They hope BIFAD might finance a research farm and obtain a Collaborating US university for staff exchange. The college will open in 1982 or 1983.

Mr. Jepson feels that if the CRSP programs are to be successful they need a place for impact, good counterparts, and good facilities. He recommended the INTSORMIL CRSP to tie into the formal arrangement between ISRA (research) and SOLDEVA (extension) recommended by USAID and World Bank.

Mr. Balis feels that if research in developing countries is to be truly effective experiments must be placed on farms. This was very successful in India with simple variety trials. The Peanut CRSP could well support an International variety trial where breeders could obtain a range of material and test their own material and at the same time test production methodology. Tests should be on farms to help get varieties and production practices to them.

He feels the CRSP objectives are too broad, an opinion he voiced while on BIFAD.

His thoughts of a variety test program are:

1. Standard package of varieties.
2. Plant on station and several farms with climatic and geographical distribution in each county. Add local, good varieties.
3. Have 2 or 3 series in trials: disease resistance, insect resistance, fertilizer use efficiency, etc.
4. Compile data and report back, and evaluate performance on a worldwide basis.
5. U. S. universities feed material into program.

Mr. Balis pointed out a fascinating sociological problem in Senegal. Men do cash crops, women do subsistence crops. Women are moved to cash crop when labor is needed. If going to influence peanuts in diet, go to woman? If increase yields, do you go to the man or woman?

We went to the office of Papa Ibrahima Thiongane, Director of ISRA but he was out of town.

The visit to Senegal was extended two days due to our not obtaining USAID clearance to Mali.