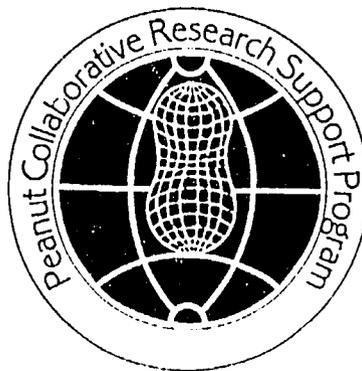


Peanut Collaborative Research Support Program



Peanut CRSP
The University of Georgia
Georgia Experiment Station
Griffin, Georgia 30223-1797
U.S.A.

United States Agency for International Development

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**PEANUT
COLLABORATIVE RESEARCH
SUPPORT PROGRAM**

TRIP REPORT

**Keith T. Ingram
January 24-28, 1994
Los Banos and Baybay Philippines**

**Supported by USAID Grant No. DAN-4048-G-00-0041-00
and the Participating U.S. Universities
and Host Country Institutions**

Peanut CRSP Trip Report
Los Baños and Baybay Philippines, 24-28 January 1994

Keith T. Ingram

Purpose: External evaluation panel visit to Philippine Peanut CRSP sites

Accompanying persons: John Cherry, Milton Coughenour, Robert Shilling

Summary of major observations and concerns:

1. Seed production constraints

Inadequate seed production and distribution were consistently mentioned as the greatest constraint to peanut production in the Philippines. Lack of capacity to increase seed prevents adoption of new cultivars. Poor seed processing, handling, and storage force farmers to use very high seeding rates, over 125 kg/ha. As a result, seed alone account for 47% of the total cost of production, compared with weeding at 20%.

Much greater effort must be made to overcome problems associated with seed production. Solutions to this problem may be through improvement in on-farm seed storage, community-based cooperatives for seed storage, or existing shelling and processing industries. The third option may be the most efficient because drying, shelling, packaging, and storage of peanut for food processing is similar to that needed for seed processing. Seed for planting may be bagged and fungicide treated immediately after shelling. To prevent damage to seed during storage, processors may try vacuum packaging as this minimizes abrasion during transportation.

2. Cagayan Valley collaborators

Although the major peanut producing region of the Philippines is the Cagayan Valley of Northern Luzon, collaborators reside in Los Baños, Laguna. To accomplish their research collaborators in Los Baños have established cooperative agreements with Department of Agriculture agents in the growing areas. We should investigate the possibilities for including collaborators from the colleges located in Cagayan and Ilagan provinces as they can probably spend more time directly involved in the research.

3. Research balance and technology dissemination

Most of the research in this project is at the applied level, that is, producing technology that can be implemented within 3 to 5 years. Over the past 12 years project collaborators have developed an impressive array of technologies for peanut

production and utilization. Unfortunately, adoption of the technology has not kept pace with technology development.

To have an impact on peanut production and sustainable development, future activities must place much greater emphasis on dissemination and adaptation of technologies. Project collaborators have already reached this conclusion themselves and we should strongly support these efforts.

Project scientists expressed interest in conducting more strategic research. This interest reflects a strong commitment to advancing science and should be encouraged to the extent possible. Clearly, strategic research is needed to provide a basis for the applied research for the future. Furthermore, to achieve sustained development, host countries must develop their own capacity for the full spectrum of research. On the other hand, in a budget constraining environment we need to closely examine how such strategic research may most efficiently be accomplished.

Details of visits and discussions:

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24 January 1994

Dr. Ester Lopez, Acting Director, Crops Research Division, PCARRD
Mr. Leandro (Andrew) Buendia, Head, Database Management Unit, PCARRD
Ms. Joan Ables, PCARRD
Dr. Eliseo Cadapan, Chairman, Dept. of Entomology, UPLB
Dr. Remedios (Remy) Abilay, Institute of Plant Breeding, UPLB
Dr. Virgilio Garcia, Institute of Food Science and Technology, UPLB

Overview of Philippine Peanut CRSP activities, PCARRD -- Ester Lopez

The Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) has a 3-fold mandate to plan, coordinate, and monitor research. The primary national objective for agricultural research and development is self-sufficiency in rice and maize by the year 2000.

For each major commodity, PCARRD has formed a team of experts to set research priorities and to review progress. Peanut research and development are planned and coordinated by the legume commodity team. The other crops included in the mandate of the legume commodity team are mungbean and soybean.

Crop	million ha	research budget
Rice	3.5	
Maize	3.4	
Coconut	3.2	
Legumes	0.11	₱ 4 million (\$150K, 13% of total)
Peanut	0.05	₱ 1 million (25% of legumes)
Mungbean	0.04	
Soybean	0.02	
Total agriculture	13.0	₱ 31 million

Today, the Philippines produces about half of their annual peanut consumption. Peanut yields 0.7 t/ha on average. As for rice and maize, the national objective for peanut research and development is self-sufficiency by 2000. The strategy to reach this objective is through improved varieties, post-harvest handling and storage, expansion of area including intercropping with coconut, and production diversification, i.e. peanut cultivation instead of rice during the dry season.

Projects in the peanut research and development portfolio include: Peanut CRSP, commercialization of peanut varieties and inoculum, seed support system, and national cooperative testing.

The major constraints to peanut production in the Philippines are: moisture, insects, weeds (30-40% of cost of production), seed availability, import competition, inadequate knowledge and capital, and acid soils.

Comments and Concerns

Not all of the major constraints to peanut production are researchable issues. Further, some constraints that require research to identify solutions are not included among the research projects. For example, there is no research project on weed management and efforts on soil moisture deficit and acid soils are minimal. Similarly, the research portfolio does not match the stated strategy to reach self sufficiency. These apparent inconsistencies between objectives and activities arise in part because PCARRD addresses only production constraints although post-harvest and utilization constraints are also important.

IPM Project Overview -- E. Cadapan

The week before our visit, entomologists and plant pathologists held a workshop to assess research progress and needs in integrated pest management. The output of the workshop was a semi-analytical framework under the columns:

Discipline/ Area	Issues/ Problems	Available technologies	Knowledge gaps	Research areas
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The workshop identified leaf folder as the major insect pest in the Philippines. A new research area identified was nematode control of insect pests. All major problems included yield loss assessment as the major activity for all research topics.

The project output with greatest impact was considered to be an integrated pest management package that includes: 1) Tricogramma, a parasite of insect pests; 2) nuclear polyhedral virus (NPV) control of insect pests; 3) resistant germplasm; 4) *Bacillus thuringiensis*; and 5) application of pesticides after flowering.

Comments and Concerns

The presentation did not have a statement of objectives or hypotheses to be tested. Nor did Dr. Cadapan have data on current pesticide use in peanut. It is surprising that after 12 years the project still has not collected data on yield loss from peanut pests. Project research has identified pests present in peanut fields, but has not quantified the yield loss from those pests.

Plant Breeding Project Overview -- Remedios Abilay

Project objectives were to develop germplasm with the following traits: high yields, large seeds, disease resistance, improved seed viability and vigor, productivity when intercropped with coconut/shade tolerance, and tolerance to acid soils.

The major project accomplishments were: UPL Pn 2, UPL Pn 4, UPL Pn 8, and UPL Pn 10 cultivars released; IPB Pn 85-2-40 and IPB Pn 85-10-68 identified for seed increase and national testing; training of technicians and growers on seed production in Ilagan.

Comments and Concerns

The criteria for breeding objectives should be quantified or defined based on the physiological mechanisms that underlie the traits. For example, rather than breeding for large seed, it would be better to breed for seed weight greater than 600 mg. Similarly, shade tolerance should be targeted for a specific radiation level, e.g. 10 MJ. There did not appear to be a formal process to establish research priorities, workplan, or budget.

Food Technology and Utilization -- Virgilio Garcia

Aflatoxin research was begun at the start of the Peanut CRSP in 1983. The major contaminants were observed in raw peanut rather than processed peanut. Similarly, contamination increased exponentially with time after harvest. Based on a survey of aflatoxin contamination in peanut butters by project scientists, the Philippine Bureau of Food and Drug ordered several brands removed from markets because of

high aflatoxin levels.

A fungus, *Cladosporium fulvum*, was found to inhibit growth of *Aspergillus parasiticus*. Research is continuing to identify the inhibitory compound so that it may be produced and applied without *C. fulvum* application.

A new research area is packaging, especially for traditional peanut products.

Comments and Concerns

The project has developed many "new" peanut products. Unfortunately, few have been adopted by the food industry. Only one product, a kare kare sauce, has reached the industrial marketing. There was some suggestion that the product was "stolen" from the researchers, that is, used without their involvement beyond generation of the original idea. Surprisingly, the researchers could not name the manufacturer or brand name of this product.

25 January 1994

Institute of Plant Breeding

Dr. Rene R.C. Espino, Director and Associate Professor
Dr. Vermando M Aquino, Assistant Director and Research Plant Pathologist
Dr. Remedios Abilay, Plant Breeder
Dr. Renato Avenido, Tissue Culturist

The Institute has three major functions, germplasm collection and evaluation, germplasm enhancement, and seed production and distribution. The major contribution of IPB to Peanut CRSP activities has been in the area of plant breeding, with about 90% of all peanut breeding activities supported through CRSP funds.

Although the National Seed Foundation increases and distributes seed, the effort is minuscule compared to demand. Storage facilities at NSF are excellent, but peanut processing equipment is very old and in poor condition. Lack of attention to peanut is because the Philippine Department of Agriculture has placed rice and maize at a much higher priority than peanut. Surprisingly, soybean has received greater support than peanut although it has a very small area under production. Most of the support for soybean has come through FAO sponsorship.

A new effort has been established to link seed production and distribution to local elected officials. In one project, a congressman provides ₱500,000/year (\$18,500) for IPB to produce seed of modern varieties of rice and maize. The congressman's office distributes all seed produced. A similar project could probably be established for peanut seed production in the Cagayan valley.

A small tissue culture activity has been initiated. Cultivar Pn 8 callus has been cultured, but to date Dr. Avenido has not been able to regenerate plants from callus.

Field plantings of peanut are late in Los Baños because of heavy rains. The few seed production plots that we observed had gappy stands. Foliar insect damage was evident, but was probably not at an economically significant level.

Comments and Concerns

The Peanut CRSP should give more support to scientific exchange visits among host countries. A specific suggestion was to support a visit of Dr. Abilay to Senegal to observe the seed production, processing, storage, and distribution systems of Senegal.

Considering the small resources allocated to tissue culture, its low priority, and the fact that other laboratories have made far greater advances in tissue culture, this activity should probably be discontinued.

Entomology Department, UPLB

Dr. Virginia Ocampo

According to Dr. Ocampo, she spends 100% of her research time on peanut, Dr. Cadapan also spends 100%, while Dr. Adalia, a host plant resistance specialist, spends 50%.

The US PI for the project spends visits once per year for 1 to 2 weeks. Most of those visits are spent in reviewing previous activities and planning future activities. No true collaborative activities are done during visits. The project would benefit from greater participation of the US scientists in Philippine activities.

In the past, entomology research was criticized for having too much survey and too little experimental activity. This criticism may still be valid, but probably reflects the fact that the researcher resides in Los Baños whereas the major peanut growing area is 400 km (18 hours by bus) to the north.

Project funding is sufficient for only one graduate student. That student is conducting research on subterranean insect pests, particularly termites and grubs. There was some question about the apparent discrepancy between the statement that leaf folder was the most important insect pest and the high portion of the budget spent for a student to conduct research on subterranean pests. Subterranean pests were not included in the analysis that found leaf folder the most important pest. Furthermore, because they are difficult to observe subterranean pests are often overlooked even though they may have great importance. The objective of the student's project is to quantify the importance of subterranean pests in the Philippines.

We visited a small facility for rearing *Tricogramma sp.* and collect eggs for release in fields. While the use of *Tricogramma sp.* to control insect pests may be economically viable and environmentally sound, application in farmers' fields appears minimal.

Research on both *Tricogramma sp.* and *Bacillus thuringiensis* emphasized extension of an existing technology rather than development of a new technology. Considering the applied nature of research, greater effort is needed to find out why farmers have not adopted the technology.

26 January 1994

Institute of Food Technology

Dr. Virgilio Garcia, Acting Director, IFT
Mr. Raul D. Divina, Assistant Professor, CLSU; PhD candidate
Dr. R.C. Mabesa
Dr. R.R. Del Rosario

Identification of the *Cladosporium sp.* inhibitor of *Aspergillus sp.* was through the help of US collaborator. Current efforts to identify the chemical agent of the inhibition are through a Japanese grant to fund a Filipino graduate student to conduct analyses in Japan. So far, the inhibitor appears to be a polyphenolic compound.

A major contribution of US collaborators to the project has been through the supply of spare parts, equipment, and other items essential to the research. US scientists often carry these items in luggage during their visits.

The future focus of the project will be on cottage industries, especially traditional products. The approach is one of searching for people with favorite personal recipes that can be adopted for small scale industry. This approach faces difficulties in that many personal recipes are not amenable to up scaling, or that some people would not be interested in making the effort necessary to participate in the industrialization process. The greatest effort will likely be in packaging to assure shelf life and sanitation.

BioTech

Dr. Teresita M. Espino, Associate Professor

BioTech has a strong commercialization mandate. They develop and package agricultural products for marketing. Some products they have produced that relate to peanut production and utilization include: MycoVAM, a mycorrhizal inoculum that enhances peanut growth; AflaTest, an ELISA kit for aflatoxin detection; *Rhizobium* inoculum; and *Bacillus thuringiensis* inoculum.

Researchers in the entomology project purchased *Bacillus thuringiensis* from BioTech. Thus, it is even more surprising that they have not made greater effort to extend the technology into farmer production systems.

27 January 1994

Visayas State College of Agriculture -- ViSCA

Dr. Nerelito Pascua, Vice-president of Administration

Funds for the project are received by PCARRD, who collects 5% overhead, then transferred to the ViSCA Foundation for Agricultural and Rural Development (VFARD), who collects 5% overhead (negotiated down from the standard 10% VFARD overhead).

Dr. Eliseo R. Ponce, Director of Research and Extension

Peanut is a short season cash crop, as compared with maize, which is a food crop first and cash crop only if production exceeds household consumption. Thus peanut occupies a small, but economically prominent position in local agriculture.

Peanut is also important because of its income generating capacity. Village processing of peanut is common, because peanut has the greatest value added for the lowest capital investment of any food product.

In Leyte, women process peanut, mostly near the site of production. An advantage of local processing is that peanut can be processed before aflatoxin contamination occurs. And processing generally arrests *Aspergillus* growth and aflatoxin production.

Dr. Lutgarda (Luth) S. Palomar, Professor of Food Processing/Food Microbiology
Dr. Lemuel M. Diamante, Food Technology/Engineering
Dr. Roberta D. Lauzon, Food Processing/Food Microbiology
Dr. Remberto Patindol

The project at ViSCA is just beginning. Its objectives are: 1) to quantify baseline socioeconomic status of project women's cooperative; 2) to standardize processing methods for new bakery products that include peanut; 3) to optimize formulas and processing; 4) to enhance shelf-life through packaging and storage technology; 5) to establish marketability and profitability; 6) to measure project impacts.

Peanut containing products in the project include peanut cookies, polvoran, peanut-sweet potato cookies, fortified lady fingers, and peanut chocass.

We visited a women's cooperative bakery activity in Ormoc, about 35 km north of ViSCA. The cooperative is temporarily housed in a Philippine Red Cross kitchen, but will establish their own kitchen when they gain enough capital from their sales.

The cooperative in Baybay is now building their bakery cum cooperative center. Until the building is completed, they are operating out of the homes of cooperative members, only one of which has an oven. Besides bakery products, this cooperative produces various meat products.

This project should establish a linkage with Dr. Abilay to get the best current peanut cultivars for local farmers and to learn whether cultivars affect product quality.

Research expressed a strong interest in using project funds to purchase journals and texts. Specific areas of interest include sensory evaluation, food safety, and packaging. They would also appreciate contributions of older journals of U.S. scientists who may no longer need them.

A project funded by Cornell University is establishing a ground station for satellite communication via electronic mail. The station communicates with a low Earth orbiting satellite on a polar orbit. The satellite passes over ViSCA twice daily. Other researchers will have second priority for use of the email. The address is v+visca@p1.vita.permanet.org