Peanut CRSP EEP

The Peanut Collaborative Research Support Program: External Review Panel Report

1996 - 2001

Executive Summary

The External Evaluation Panel (EEP) strongly supports a 5-Year extension of the Peanut Collaborative Research Support Program (Peanut CRSP) beginning August 1, 2001. This recommendation is based on the scientific achievements since August 1996, which are already making or have potential of making clear and significant scientific and technological impacts in both developing countries or host countries (HC's) and the United States. The scientific advances of this latest phase as presented in this EEP report are not isolated events because they are built upon the many achievements of Peanut CRSP since its inception in 1982. The impacts are in some cases based on research that requires long-term efforts (i.e., developing high yielding, pest and drought resistant, new peanut cultivars), which underlie the need and benefits of the long-term, sustained support of Peanut CRSP. In other cases, highly significant impacts have come to fruition based on past work or evolved (such as vitamin A fortified and stabilized peanut butter products) during the past four years.

The EEP believes that Peanut CRSP has great relevance both to the U.S. and HC's. The Peanut CRSP plays a relevant role in assisting research, technology transfer and educational programs in HC's and brings graduate students and visiting scientists to U.S. university programs. Available is the U.S. scientific expertise often lacking, but growing in the HC's. With this U.S. expertise comes scientific literature that is not always available to the HC's. Working with the U.S. universities boosts the confidence of HC researchers. Visits to the U.S., or international and regional workshops are made possible by Peanut CRSP. Experience gained by U.S. scientists through HC collaborations provides international insights so important to U.S. research programs to improve the efficiency of production and utilization of peanuts in the U.S., as is being done in HC's. This is an important function of the CRSPs, and especially Peanut CRSP, which was anticipated by those who initially conceptualized these programs and now has come true.

The Peanut CRSP was implemented in 1982. It is funded through Title XII - Famine Prevention and Freedom from Hunger and authorized under the International Development and Food Assistance Act of 1975. The United States Agency for International Development (USAID) implemented Peanut CRSP through Grant No. LAG-G-00-96-90013-00 to the University of Georgia. The funds are competitively awarded as grants to ten U.S. universities including Alabama A&M University, Auburn University, University of Connecticut,University of Florida, University of Georgia, Purdue University, North Carolina A&T State University, North Carolina

State University, Virginia Polytechnic Institute and State University and Texas A&M University. The Principal Investigators (PI's) at the U.S. universities have developed an impressive international collaborative research network of 21 projects with researchers (PI's) at 32 institutions and universities in 17 HC's as follows: West Africa - Institut National Recherches Agricoles (INRAB), Benin; Institut de L'Environnement et des Recherches Agricoles (INERA) and University of Ouagadougou, Burkina Faso; Council for Scientific and Industrial Research (CSIR), Crops Research Institute, Food Research Institute, Savanna Research Institute, University of Ghana, and University of Science and Technology, Ghana; Institut d'Economie Rurale (IER), Mali; Institut National de Recherches Agronomiques du Niger (INRAN), Niger; Ecole National d'Economie Appliquee (ENEA) and Institut Senegalais de Recherches Agricoles (ISRA), Senegal; Southern Africa - Department of Agriculture, Chitedze Research Station and Bunda College, Malawi; Latin America and the Caribbean -Asociacion de Productores de Oleaginosas Y Trigo (ANAPO) and Centro de Investigacion Agricola Tropical (CIAT), Bolivia, Caribbean Agricultural Research and Development Institute (CARDI), Trinidad, Jamaica and Belize, Southeastern Consortium for International Development (SECID) for coordination of programs with faculty and staff in Quisqueya University and the Center for Agricultural Research and Documentation (CRDA), Haiti, and Foundacion Peru, Peru; Eastern Europe - Canning Research Institute, Higher Agricultural Institute and Institute for Introduction and Plant Genetic Resources, Bulgaria; and Southeast Asia - Philippine Council for Agriculture, Forestry and Resources Research and Development (PCARRD), Food Research Center, Department of Agriculture, University of the Philippines, Los Banos, and Visayas State College of Agriculture, the Philippines.

Peanut CRSP played a major role in developing the peanut research program and industry in Thailand. Now that Thailand has become an Advanced Developed Country, Peanut CRSP has a Regional Program for training in Southeast Asia at Kasetsart University and Khon Kaen University. In Latin America, a regional program is in place with Empresa Brazilaria de Pesquisa Aropecuaria (EMBRAPA), Brazil's agricultural research corporation, with monies from the Common Fund for Commodities of the United Nations Foreign Agricultural Organization (UNFAO) for germplasm preservation.

Strong cooperative programs have evolved through Peanut CRSP with international and regional research centers. They are the Centre de Cooperation Internationale en Recherche Agronomique Pour le Developpement - Department des Cultures Annuelles (CIRAD-CA), France, and Conference des Responsables Africans et Francais de le Recherche Agronomique (CORAF), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and International Institute for Tropical Agriculture (ITTA), Africa.

In the U.S., important liaisons are maintained with a number of private and non-government industrial support agencies including the American Peanut Council, Peanut Institute, Southeastern Consortium for International Development, Peanut Commodity Commissions and Grower Groups in States with peanut programs and participating universities and World Vision, Incorporated.

The EEP recognizes the importance of research in providing technology for international development. The USAID is commended for its foresight in developing the CRSPs and for providing long-term support for the Peanut CRSP. The U.S. universities are recognized for the research support and benefits given to the U.S. investigators and services provided to

international development from their investments and participations. The HC's and their institutions are acknowledged for the investment of resources in view of anticipated benefits from their development. Without these commitments, the success of the Peanut CRSP would be limited.

The EEP review process examined each project to determine the adequacy of and progress on the objectives to meet the assigned constraints. This included the approaches to determine their appropriateness to meet the objectives. The status of the achievements included potential for applicability and impact to the U.S. and HC's, and having regional and/or global relevancy. Collaborations or multi-disciplinary involvements were noted. Other factors examined included benefits to stakeholders or developing and establishing small and large businesses, increasing consumer's interests and advancing human resources (especially female operated businesses) development. The evaluation section examined the strengths and weaknesses based on rate of progress, potential for success and application-impact on science and technology and included adequacy of funds, all levels of management input and administrative support.

The EEP review provided recommendations at two levels: 1) general recommendations based on overall observations, accomplishments, impacts, short-comings, and suggested changes and/or continuations; and 2) specific recommendations on individual projects or sections based on a common review and ranking system. Based on item 2, the projects were categorized to recommend continuation, continuation after specific adjustments or discontinuation and replacement.

General Recommendations and Observations

1.Technical Areas

It is important to note that Peanut CRSP is a global program focusing on and having impact in five high priority constraints. They are: (1) Aflatoxin contamination - Outcome expected is improved health, trade and value through decreased or eliminated aflatoxin contamination. The approach to solving the problem is through genetic prevention, preharvest and postharvest management processes and detoxification of contaminated peanuts and peanut products.

(2) Production efficiency - Outcome expected is increased farm prosperity through improved production efficiency and sustainability. The approach is genetic improvement, better management practices and model-guided management, research and policy recommendations.

(3)Socioeconomic forces - Outcome expected is rapid development through the adoption of technologies resulting from more sociologically appropriate research, policy interventions and technology transfer. The approach determines the effects of gender input and policy on the peanut system and the impact of adopted technologies.

(4) Postharvest and marketing technologies - Outcome expected is improved health, increased prosperity and consumption of peanuts as safer, more nutritious value-added products. The approach is to better understand the nutritional benefits of peanuts, expand availability of peanut products meeting local preferences and increase income and employment from production of value-added products.

(5) Training, information and program support - Outcome expected is the development and adoption of profitable technologies through increased training, technology transfer and scientific exchange. The approach is by consolidation and distribution of information, training scientists and development of collaborative linkages and scientists' exchange programs.

We commend the Peanut CRSP for adding the socio-economic constraint in 1996, as a distinct technical area. We believe this constraint encompasses the technological concerns necessary to enhance the position of peanuts as an already important source of food and income in developing countries, as well as provide important science and technology to the U.S. We also believe that the socio-economic constraint would be even further met if this technical area were incorporated with funds into selective postharvest and marketing projects. The collaborative nature of the program gives Peanut CRSP a comparative advantage to other agricultural crops in providing scientific and technical information necessary to support the production and use of peanuts, a commodity proven to be critical to economic development in many developing countries. Although limited financial resources place a strain on Peanut CRSP to support these constraints, the EEP recommends that these five areas be maintained but with a strengthening of collaborative efforts among projects within and among the technical areas.

2. Geographic Distribution

It is noted that two world regions were added to the Peanut CRSP in 1996, Latin America and Eastern Europe. We commend the vision that worldwide benefits from research and development activities of Peanut CRSP could be expanded to Latin American countries where peanut originated, particularly in the identification, evaluation, and use of germplasm. Also, the Peanut CRSP accepted the challenge to assist countries in Eastern Europe move into a free-market society through collaborative work in Bulgaria. The strengthened program in Africa should continue in order to contribute to food security and economic development in this part of the world. Population growth in Asia demands a continued presence of the Peanut CRSP. Although peanut is a minor commodity in the Caribbean region, food and economic issues justify a continued presence of the Peanut CRSP. Since peanuts are grown in most countries in latitudes below 40 degrees and are critical to economic and food safety issues, particularly with subsistence farmers and small-scale processors of food in many countries, the EEP feels comfortable in recommending continuing the present geographic coverage of Peanut CRSP.

3. Expanded Participation

The 1996 Peanut CRSP grant expanded U.S. university participation from four to ten, which provided access to important resources needed in the overall program. Host Country participation was increased from nine to 17, particularly notable were the countries in Southern Africa, Latin America, and Eastern Europe. The multi-project/efforts addressing all constraints in countries representing regions, such as Western and Southern Africa and Eastern Europe, will promote regional technology transfer of achievements. The EEP recommends programs continue in countries representing these regions. One special observation regarding the Caribbean region is noted here. Because the USAID Mission does not support work in Haiti, and due to existing unstable political issues, the EEP recommends termination of the project in this country.

4. New Management Procedures

The Peanut CRSP has a new Director, Dr. J. H. Williams, following the retirement of the long-term Director, Dr. David Cummins. The EEP commends the smooth transition. However, concern is expressed about fund constraints preventing the addition of a new Associate Director.

The Peanut CRSP Management Entity (ME) continues to give excellent leadership in guiding and coordinating programs during this period reviewed. Dr. Tim Williams is applauded for his managing of Peanut CRSP without a full time Associate. In the past, the Peanut CRSP was managed by two managers, a Director and Associate Director. Moreover, Dr. Williams manages a greatly increased Peanut CRSP program including 21 projects under five constraints assigned to 42 U.S. universities and HC institutes-universities in 19 countries worldwide. This is a large management responsibility which has been handled well, a tribute to the dedicated work and long hours supported by the computerized data system and website uniquely implemented by Dr. Williams.

The EEP sees the need for an Associate Director with expertise in the sciences and engineering of Peanut CRSP to allow more time for the Director to visit with PI's worldwide and give greater commitment to resolving issues at U.S. and HC sites. An Associate Director would also assist in public relations, i.e., developing information documents of Peanut CRSP's accomplishments and their impact and visiting with stakeholders, important action items needed to maintain program visibility. The present review process during year 2000 is challenging because of involvements with the EEP and in addition, the upcoming review by a USAID coordinated Administrative Management Review Team focusing primarily on the administrative management aspects of Peanut CRSP. Moreover, support will be needed to properly prepare the Request for Proposal (RFP), solicit and conduct the reviews, select, award and initiate the projects for continuation in the next five-year 2001-2006 Peanut CRSP.

At this time, the EEP suggests hiring Dr. David Cummins as an Interim or Consulting Associate Director to assist Dr. Williams during this critical transition period. Dr. Cummins could implement and coordinate the new RFP process to conclusion and start-up of the approved projects. His years of recognition as a major contributor and knowledgeable leader in Peanut CRSP makes Dr. Cummins a natural for assuring that public relations continues to maintain program visibility among all stakeholders. Other duties can be assigned as his years of expertise are needed.

5. Peanut CRSP Website

The EEP commends the web site for peanut CRSP:

http://www.griffin.peachnet.edu/pnutcrsp.html

The web site presents everything one would want to know about the Peanut CRSP. The projects, research advances, developing technologies, progress reports, workshops, seminars and published proceedings, books and journal articles are posted on the web site. The web site shows an impressive presentation of Peanut CRSP's productivity. Especially noteworthy is that the ME has added approaches for budget tracking-expenditure spending and communicating research progress and reports of each project worldwide via the Peanut CRSP computer database within the web site. This has given the limited management resource the ability to deal with the disproportionate number of worldwide projects and enhance communications with and among

PI's in the U.S. and HC's. Examining other CRSP web sites show that Peanut CRSP is a leader in providing information describing itself and its advances in research work and technologies and communicating, including reporting, on the world wide web, a commendable achievement and a model for others to follow.

To enhance use of the new web site technologies developed by Dr. Williams, funds of peanut CRSP should be used to purchase computers and appropriate software for HC PI's. This will greatly enhance communication by U.S. and HC PI's, and strengthen research reporting, training opportunities, meetings, and fiscal accountability worldwide for the ME and Peanut CRSP.

6. Timeliness of Funding

There is a seemingly ever-present issue with USAID and the University of Georgia on the timeliness of funding for the projects/subgrants to the U.S. and HC institutions. Delays are usually due to date of availability of funds to the ME from USAID. The University of Georgia administrative office requires a certain amount of time to prepare documents for transfer to the participating universities. This also delays funds being available to the overseas counterparts. Often this impacts the ability of scientists to proceed with experiments in a timely manner. The delays are particularly detrimental to field research where constraints are put on meeting seed planting dates, and other seasonally controlled agricultural practices. Some projects and institutions may be able to bridge-fund from other resources and minimize the impact to progress, while others cannot. This puts the latter institutions at a disadvantage when progress is measured against the former institutions. The EEP encourages every effort be made for timely availability of funds for Peanut CRSP.

7. Socioeconomic Studies

The socioeconomic projects are "free-standing." The EEP feels that Peanut CRSP should look for ways to align these projects more closely with the food safety production and utilization projects. The result may be development of science and technologies more likely to be oriented toward and adopted by end-users and increased ability to measure potential or real impacts. It is noted that three projects (UGA04U, the Philippines; UGA11U, Bulgaria and UFL13P, Africa), have taken the initiative with present funds to support the need of socioeconomic capabilities with multi-disciplinary teams which performed well and serve as models for more closely aligned collaborative programs. These projects should be given an opportunity to expand the socioeconomic components with increased funding for socioeconomic components.

8. Aflatoxin and Food Safety Studies

In the food safety area there are two projects with goals to model the risks of Aspergilli fungal invasion and aflatoxin contamination. Another project seeks to model insect damage risks, while another links these issues to production. The EEP recommends that ways be found to formally link these projects to increase ability for success and their impact potential.

Aflatoxin is detrimental to health in many developing countries, particularly sub-Saharan Africa. The EEP is aware of the potential that clay additives have when added to feed and/or food to lessen the negative health effects through technology developed earlier by Peanut CRSP researchers in Senegal. This is an example of past research developments coming to fruition as

Peanut CRSP continues. The Peanut CRSP should actively explore ways to test and extend this technology to African food systems, as well as other world regions. The Public Health Agencies, Noguchi Memorial Institute for Medical Research - Ghana, and IARC - France, are devoted to cancer research. Collaborations of Peanut CRSP scientists with researchers from these public health institutions could lead to new nutritionally-based technologies on clay additives to absorb aflatoxins and reduce cancer in populations.

The Peanut CRSP should increase efforts to foster awareness of the nutritional value of and the food safety (aflatoxins) and allergy problems of peanuts. The EEP commends PI's of the Purdue University Project (PUR10U) for their research progress and dissemination of results on the nutritional value of peanuts and peanut products particularly the health benefits without weight gain and improved cardiovascular risk status.

9. Production Efficiency

Research studies of projects in the Production Efficiency constraint have evolved from doing mainly classical breeding work to molecular biology (biotechnology) and modeling for risk assessment and management strategies. A number of these projects overlap in their objectives and approaches, particularly in the areas of modeling for risk assessment and management strategies. More projects would benefit from using these techniques to gain base data and to assist in technology transfer. To better use these technologies, greater inter-project collaborations is necessary. The EEP strongly recommends that more formal contacts be facilitated, e.g., meetings of PI's working in these areas at the annual American Peanut Research and Education Society meetings. In addition, there is potential for greater regional cooperation, particularly in administrative coordination where regional teams, e.g., in West and Central Africa, Southern and Eastern Africa, Southeast Asia, etc., and PI's could coordinate efforts in conjunction with the ME.

10. International Publications

The Peanut CRSP should strengthen continued publicizing international research and program developments through publications, (e.g., International Arachis Newsletter), technology transfer brochures, cooperative workshops and meetings, proceedings, and its web site, etc.

11. International Collaborations

The EEP commends the Peanut CRSP for maintaining a productive international coopereative relationship (Project UGA40) since the beginning of the program. This project actively links the global peanut research and development programs. Many training and information dissemination workshops, laboratory and field training of scientists and technicians, publications, and scientific exchanges have occurred. This project to assure covering and promoting these activities was a positive action. The project should continue and could use more funding from Peanut CRSP and alsoICRISAT.

In managing this project, it is appropriate for the ME or a designee to continue as PI of Project UGA40. ICRISAT should also appoint a permanent PI. The EEP recommends that three regional PI's would be advantageous due to the regional thrusts of ICRISAT. Further, Dr. Nigam could represent the Central office in Hyderabad, India, and continue to coordinate their efforts in the

International Arachis Newsletter, published jointly with Peanut CRSP. Dr. Waliyar could represent the West Africa program from his post in Mali and assist in coordinating the Peanut CRSP efforts with regional groups such as CORAF supported by France. Dr. Subramanyam could be the Southern Africa coordinator from his Malawi post. This would serve the goals of the project. The collaboration could be further enhanced if ICRISAT's PI's had a role in inter-project coordination within their region, i.e., identification of scientists in the region interested in working with Peanut CRSP.

Considerable effort was made by Peanut CRSP to work with ICRISAT in germplasm collection and preservation in Bolivia. This effort was not responded to by ICRISAT. The EEP would hope that project follow through would occur on such important work in the future. Also, Peanut CRSP often takes the initiative to propose that ICRISAT scientists collaborate on projects; the collaboration could be further enhanced if ICRISAT also take the inititive to enroll Peanut CRSP scientists in its projects.

It is noted that a memorandum of understanding between Peanut CRSP and ICRISAT has been signed. The agreement that defines fund flow and project management needs is still awaiting signature by ICRISAT and should be further encouraged by Peanut CRSP.

12. Training

The ME coordinated project (UGA39) on long- and short-term training of HC scientists was established based on recommendations by the last USAID coordinated Administrative Management Review Team to ensure that the Peanut CRSP provided training support that best fits HC needs and priorities. Funds are allotted from annual funding to support training. The PI's in coordination with HC counterparts nominate candidates for training slots. Priorities were established and approved in the first year of the present grant and funded from second year funds. Four students were selected for support; two Ph.D. candidates in genetics/breeding and agricultural economics from Senegal, and two Ph.D. candidates in plant pathology/virology from Malawi, and a M.S. candidate in agricultural economics from Haiti. Unfortunately, fund reduction has allowed only ongoing training be continued with those students already in the program. The full potential of this training plan cannot be reached because of the lack of financial support. The response of the ME and Board of Directors to the 1997 fund reduction was to limit training to efforts underway, which meant that advanced degree training was severely eroded.

The EEP notes that limited advanced degree or long-term training of HC scientists will have serious negative impact on the future peanut scientist's pool in the international community. In turn, the advancement of peanut production and use will be slowed or in some areas eliminated with negative consequences in the food supply for expanding populations in developing countries.

The EEP commends the Peanut CRSP for supporting workshops, publications, and short-term training under this project. A review of Annual Reports shows the following programs: Asia Regional Workshop with ICRISAT India in aflatoxin detection methodology, Product Development Training Workshop at the University of Georgia for participants from Bulgaria, Philippines, Belize, Jamaica, and Haiti, an ANAPO-Bolivia scientist trained for four months at the University of Florida, an Application in Modeling to Cropping Systems Workshop in West

Africa in cooperation with IFDC and the University of Florida, and the West Africa Regional Peanut workshop in Ghana co-sponsored with ICRISAT and CIRAD-CA (France). An Aflatoxin Management Workshop was held in Ghana, and in the Philippines, a workshop focused on educating industries on preferences for peanut and peanut products by consumers.

Selected Achievements-Impacts

Selected, notable achievements and impacts, are highlighted; other successes can be found in the individual project reviews.

1. The research conducted at Purdue University and the Food Research Institute, Ghana (Project PUR10U) has shown that the high energy content of peanut is offset by the high satiety value of the commodity. This means that peanut consumers are not at risk for obesity and cardiovascular risk from a high caloric intake of peanuts. The research has also contributed to the body of knowledge showing that peanut oils are healthy and have positive cardiovascular health benefits.

This research has received attention in the U.S. where it has been used to promote peanut consumption, which has helped reverse a 5-year (18%) decline in consumption. One industry representative states that U.S. consumption has increased 13% since this research began, and the impact has been estimated by the industry to be worth as much as $500 million annually. In developing countries and for USAID's humanitarian response efforts, the information that peanut is a very hunger satisfying food, with high protein and high energy content suggests that this commodity should be exploited in times of civil crisis and famine since more hunger prevention is delivered per payload than from the commonly used emergency rations.

2. In the Philippines 35% of the children are deficient in Vitamin A. This situation causes blindness and decreases child survival. Market research conducted with Peanut CRSP (Project UGA04U) support showed that peanut butter is consumed by all sectors of the population, a fact that makes it an ideal vehicle for health interventions.

In collaboration with commercial processors in Manila, the scientists supported by the Peanut CRSP (UGA04U) developed a vitamin A-fortified peanut butter. This product has been commercialized and now has a 35% market share in the Metro-Manila area and is sold nationwide. Commercial competition is encouraging other peanut processors to develop competing products.

The EEP is highly impressed with this work and recommends that USAID consider investing additional resources to further the use of this important technology in the Philippines and worldwide in areas of vitamin A deficiency, both commercially and in food intervention programs.

3. Liver cancer rates in Southeast Asia are 36 times those observed in the U.S. Aflatoxin and hepatis B interact to greatly increase the risk of this cancer in these areas. Researchers in the Philippines with support from Peanut CRSP (Project UGA04U) working with a peanut-based food industry have developed sorting techniques to control aflatoxin contamination. This has allowed companies to exploit the world-wide trade market opportunities for ethnic Filippino sauces and expand operations. Production has increased 40% in the year since the technology

was deployed. Other companies are positioning themselves to adopt this technology, which will ensure widespread adoption of the technology.

4. In Senegal, a cultivar - Fleur 11 - developed by ISRA scientists in Peanut CRSP Project (TAM17P) is being adopted by farmers. On farm socio-economic studies by another Peanut CRSP project (UCN36S) show that farmers find this cultivar maintains it's 25% yield advantage over the established cultivar. Presently, adoption is limited by seed volumes, but the potential impact will be an additional $18 million annually to the peanut farmers in Senegal. The release of a second and improved cultivar is emminent.

5. In Malawi, Peanut CRSP Project (UGA28P) which is focused on developing and exploiting virus resistance has exploited the testing of lines resistant to the Groundnut Rosette Virus (GRV) disease developed by ICRISAT. These lines are now being released and multiplied for distribution to farmers, with support from the USAID-Malawi Mission. The potential benefits to Malawi farmers are the elimination of rosette epidemics that decimate production every 5-7 years. This will provide greater food stability, higher mean yields, and encourage farmers to produce peanuts since the risks of loss will be decreased.

Studies of GRV variability across Africa indicate that resistance based on viral coat-protein of the GRV assistor virus should be stable and research in Georgia has produced transformants using a synthetic gene.

6. Basic research at Texas A&M University (Project TAM33A) has identified two genes that are critical to the production of aflatoxin by the Aspergilli fungi. These genes may allow molecular engineering techniques to eliminate or greatly diminish contamination of peanuts when infected by the fungus.

7. Socio-economic research in Senegal (Peanut CRSP project UCN36S) mobilized the Ecole Nationale D'Economie d'Applique (ENEA) to focus on economic problems in farm level peanut production. The University of Connecticut has been involved with this development over a ten-year period. The research has determined that the pricing policies, fiscal practices, and market structure measures followed by the Government of Senegal are not fully serving the peanut sector of the country. Additionally, it has been offered by the researchers that the keys to future success will be farm level efficiency, environmental quality, high seed quality, and inputs to enhance productivity. The project has encouraged positive interaction between ENEA and ISRA (Senegalese Agricultural Research Institute), which has more fully contributed the strengths of ENEA to the agricultural sector.

8. Socio-economic Peanut CRSP project (NCS07S) has established an ongoing impact assessment procedure. Assessments have shown that in Jamaica a Peanut CRSP cultivar was adopted but use diminished. On the other-hand technologies for production adopted by farmers with the cultivar have continued to be used. In the Philippines, Peanut CRSP cultivars are being planed more in the major peanut region, and their use is a major effort of the Philippine's government agricultural programs. The EEP encourages the Peanut CRSP to continue and expand if possible the important work of this project.

9. When considered from the aspect of resources available, the Peanut CRSP has been very successful with its training efforts. Trainees include: 49 for short-term training, 11 Master of

Science candidates, 8 Ph.D. candidates, 2 other for a total of 70. In this total, 26 were female and 44 male, a good gender balance. Five workshops/training courses have been support in Ghana, ICRISAT-India, Thailand, Georgia-USA, and Mali. Should resources be available, the EEP would encourage expanding training. Especially important is training in regions such as Southern Africa where disease and other factors are significantly reducing the work force.

The collaborative nature of the Peanut CRSP by design provides agricultural benefits to U.S. and HC producers, handlers, processors and consumers. These collaborations, including intra- and inter-project and multi-disciplinary teams need to be greatly increased. The research studies undertaken benefit the U.S. and HC's because of the global nature of the constraints addressed. Aflatoxin reduction and nutrition research projects expand market value by nationally and internationally increasing demand and diminishing adverse perceptions concerning peanuts. Experience in low-input production systems researched in HC's help develop lower cost systems in the U.S., and vice versa. Research work on the use of genetic options combined with better management practices to control pests and diseases of peanut are reducing inputs that currently represent, e.g., in the U.S., 50% of the production costs. The postharvest, utilization and marketing research work supported by Peanut CRSP increases demand for peanuts and improves profits and international trade. These efforts enhance development of small and large businesses, especially women-operated ventures; it is important that these latter efforts continue.

The Peanut CRSP as part of the CRSP concept is extremely imaginative in that it is designed on the basis that all participants in the program benefit. This not only has generated support for CRSP proposals in the U.S. Congress but is in tune with the sentiments of the population at large, including stakeholders and consumers, who by and large are sympathetic to the ideals of Third World development. The PI's of the U.S. and HC's are cast in the role of collaborators allowing perceptions that all involved are having their scientific horizons broadened. In addition, the biological and socioeconomic understandings of all personnel involved are deepened and imaginations enhanced by what is observed and the prospects for future visions enhanced. This has brought Peanut CRSP to a successful performance level because this style attracts quality scientific personnel and skillful managers working together to keep the program on track by overcoming unnecessary interferences and gaining adequate support and encouragement. The direct funding at the institutional level and constructive review processes has minimized misdirection. The existence of an independent EEP to monitor progress has ensured proper accountability. The whole Peanut CRSP venture has been extremely successful, a startling contrast to the many unsuccessful exercises that have served only to generate despair in those who wish to see the developing world grow.

EEP Members

The EEP was selected and approved in 1997 to conduct project reviews during the 1996-2001 time frame approved for Peanut CRSP. This includes the latest review, the subject of this report, for making recommendations regarding the 2001-1006 extension. The EEP members were nominated by the PI's, Technical Committee, Board of Directors and ME. The nominees were approved by BIFAD/USAID. Basic criteria used in the selection process included: (1) a background in and basic understanding of science; (2) experience in international agricultural research and/or development and knowledge of developing country problems; (3) specific experience in peanut research; and (4) an understanding of the U.S. land grant research system.

The EEP consists of:

Coordinator Dr. John Cherry (expertise food and agricultural sciences), Director, ARS, USDA, Eastern Regional Research Center, Wyndmoor, PA

Dr. Geoffrey Hildebrand (expertise production and plant breeding), Seed Co. Limited, Harare, Zimbabwe

Dr. Duncan McDonald (expertise pathology and mycotoxins), retired ICRISAT, Peebles, Scotland

Dr. Handy J. Williamson (expertise socio-economics), Agricultural Economics and Rural Sociology Department (formerly Head), University of Tennessee, Knoxville

Mr. Jeffrey Johnson (expertise post-harvest and the U.S. peanut industry sector), Birdsong Peanuts, Suffolk, VA

Dr. Ron W. Gibbons (consultant to EEP and production/plant breeding), retired ICRISAT, Bedford, UK.

The review was conducted using published annual Peanut CRSP, EEP and related reports, initial 1996 and ongoing work plans, PI self assessment surveys, site visits, and other pertinent available written documentation; on-site review travels to HC and U.S. institutions; and meetings of the EEP to examine and consolidate findings, develop recommendations and write the EEP report for the Peanut CRSP. The EEP expresses appreciation to the ME for excellent support throughout the review

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1. Mandate

The Collaborative Research Support Program (CRSP) guidelines and the Peanut CRSP policies and procedures require an intensive evaluation of the program by an External Evaluation Panel (EEP) every five years.

The purpose of the EEP is to evaluate the plans, funding and progress of the research program and make recommendations thereon. The members shall be reputed scientists in appropriate areas of expertise.

In undertaking an intensive review of the Global Program, site visits to U.S. and host country (HC) research sites are made.

Recommendations from this review become part of the documentation for program extensions, which may include: addition, elimination or modification of overall objectives, and component projects; and retention, elimination, or addition of new overseas or U.S. sites, or institutions.

2. Members

1. John P. Cherry

Eastern Regional Research Center, 600 E. Mermaid Ln.,Wyndmoor, PA. 19038

Expertise: Food and Agricultural Science and Technology

Dr. Cherry is Director of the USDA Eastern Regional Research Center since 1984, and Associate Director from 1982-84. The program at this Center is supported with over $25 million annually and has about 300 employees. The center has seven research units whose mission is to develop through basic, applied, and developmental research, new knowledge and technology that will ensure an abundance of high quality and safe agricultural commodities and products at reasonable prices to meet increasing demands and to provide a continued improvement in the standard of living of all Americans. The research units are Dairy Products, Engineering Science, Food Safety, Hides, Lipids and Wool, Microbial Biochemistry and Biophysics and Core Technology, Microbial Food Safety, and Plant Science and Technology. From 1976-82, Dr. Cherry was Research Leader and Laboratory Chief of the Oilseed and Food Laboratory at the USDA Southern Regional Research Center, New Orleans, LA. He was on the faculty of the Food Science Department at the University of Georgia, Georgia Station from 1973-76. He has worked extensively with peanut and cotton seed in the areas of biochemistry, food processing, and utilization. He has studied the physiochemical properties of proteins, enzymes, pigments, and lecithins; biochemical genetics and chemotaxonomy; microbiology and biochemistry of plant host-pathogen relationships; genetic and environmental factors affecting seed composition; cell membrane biochemistry; and physicochemical principles of food processing, functionality and nutrition. He has had particular interest in protein utilization and enzymes as indicators of food quality. Dr. Cherry has also been most closely involved in international activities through the OICD/PL 480 program, the State Department - FAS-ICD project with Japan, Ireland and Eastern European countries, and USAID Peanut CRSP.

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2. Ron W. Gibbons - Consultant to EEP

12 Restormel Close, Putnoe, Bedford, U.K. MK 41 8 PA

Expertise: Peanut Sciences - Production

Dr. Gibbons is recognized as one of the leading groundnut scientists in the world. He served as Executive Director of ICRISAT Sahelian Center, Niamey, Niger from May 1986 until his retirement in 1992. He was responsible for ICRISAT programs in Niger, Mali, and Nigeria including multidisciplinary teams working on millet, groundnut, sorghum and resource management plus support units. Also responsible for scientists of other organizations including IITA, ILCA, IBPGR, ORSTOM, IFPRI, University of Hohenheim and University of Wagenigen, working in conjunction with ICRISAT at the Sahelian Center. He worked with ICRISAT-India from April 1976 to May 1986. He was appointed Principal Plant Breeder and Team Leader for the newly-created Groundnut Improvement Program. He developed the plan for the long-term research program and recruitment of staff that was approved by the ICRISAT Governing Board in 1976. He lead the groundnut breeding program and developed the Groundnut Improvement Program into a world-class effort. From

1963-1976 he served with the Agricultural Research Council of Central Africa supported by the United Kingdom and member governments of Zimbabwe, Zambia, and Malawi, and was located in Malawi. Later the program transfered to the Agricultural Research Council of Malawi. Duties included groundnut breeding and administration. From 1955-63 he served in the UK Overseas Civil Service. He was botanist/plant breeder, for Northern Nigeria and officer in charge of the groundnut substation in Kano.

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3. Geoffrey Hildebrand

P.O. Box CH 142, Chisipite, Harare, Zimbabwe

Expertise: Peanut Production and S.E. Africa

Dr. Hildebrand has extensive experience as a groundnut breeder and in providing advisory service to farmers. He has been employed by Seed Co. Limited, Harare, Zimbabwe since 1994, with responsibilities in groundnut breeding, providing an advisory service to growers, and assisting farmer-seed producers in maintenance of quality standards. From 1987-1994 he was Principal Groundnut Breeder, ICRISAT-Malawi. Achievements include: identification of germplasm with useful traits, cooperation with Regional NARS programs to distribute improved germplasm, and development of lines resistant to the devastating rosette virus. From 1982-1987, he worked on a grower-sponsored groundnut breeding project at the University of Zimbabwe and studied for his Ph.D. in agriculture. From 1967-1982 he was research officer in the Crop Breeding Institute, Ministry of Agriculture, Zimbabwe. His breeding program served large-scale irrigated commercial production as well as rain-fed small-scale and subsistence production, and provided advisory service to large- and small-scale farmers.

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4. Jeffrey Johnson

Birdsong Peanuts, 612 Madison Ave., Suffolk, VA. 23439

Expertise: Peanut Post-harvest and U.S. Peanut Sector.

Mr. Johnson has served as Senior Vice President and Director of Marketing for Birdsong Peanuts since 1991; previously he served as Vice President from 1984 and Assistant Vice President from 1979. From 1974 -79, he served in Export Sales and as Export Sales Manager. From 1972-74, he was Factory Manager of the All American Peanut Company. He traveled and worked extensively in Europe and Asia in export sales activities. Additionally, he has done extensive work in the U.S. in manufacturing and sale of peanut and peanut products. He founded the Peanut Institute in 1996 and served as its first President. The Peanut Institute promotes research and development activities to increase awareness of the quality of peanut as a food.

5. Duncan McDonald

Dunslair Glentress, Peebles, Scotland, U.K. EH 45 8 NB

Expertise: Pathology and Mycotoxins.

Dr. McDonald is recognized as a world leader in peanut pathology and factors related to aflatoxin contamination. He served with ICRISAT-India from 1978 until his retirement in 1994. Field and laboratory research duties were Principal Groundnut (Peanut) Pathologist and Leader of the Groundnut Pathology Sub-Program. He worked on various aspects of groundnut diseases with particular emphasis on identification and utilization of disease resistance. Dr. McDonald cooperated with ICRISAT, Developing Country National Programs, and Developed Country Scientists worldwide. He became Groundnut Group Leader in a newly constituted ICRISAT Legumes Program in 1987, and Legumes Program Leader in 1990. He served as Director of a newly organized Crop Protection Division from January 1994 until his retirement in November 1994. He served as groundnut pathologist and in various administrative posts in Nigeria from 1957 to 1978; including Head of the Crop Protection Department of Ahmadu Bello University.

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6. Handy J. Williamson

Agri-Economics, University of Tennessee., 325 Morgan Hall, Knoxville, TN. 37996

Expertise: Socio-economics

Dr. Williamson was appointed head of the Agri-Economics Department in 1988. He was responsible for leading and managing research programs, resident instruction and outreach functions. Following a 1987-88 Sabbatical Leave at University of California-Davis, he returned to the University of Tennessee Agri-Economics Department as professor. From 1985-88, he served as Deputy Director for Research and University Relations, USAID-Washington. In this role, he allocated and provided oversight for a $10 million annual budget to support grants with U.S. universities in the fields of agriculture, education, public health, medicine, natural resources, and development. While employed at Tennessee State University-Nashville from 1977-85, he held the positions of Associate Professor of Agricultural Economics, Director of the Cooperative Agricultural Research Program, and Coordinator of International Agricultural Development Activities. From 1974-77 he was Associate Director of the Center for Rural Development Research and Assistant Professor of Agricultural Economics at Tuskegee University-Alabama. Dr. Williamson has been a consultant on many projects and review teams in Africa, the Caribbean, the Far East and the U.S. Several state, regional, and national committees, boards, and task forces have benefitted from his professional/technical contributions. His research and publications include economic and rural development studies affecting land use, resource management, manpower training, research and extension development, and efficiency of small and large farms in diverse geographical settings.

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3. Background

The present phase of the Peanut CRSP has been in place for 4 years, commencing 1 August 1996, under USAID Grant LAG-G-00-96-90013-00. The program initially underwent a major restructuring which was the outcome of a review of the peanut science and technology, worldwide needs and opportunities, by an independent panel of experts.

New Features of the Peanut CRSP.

Program Changes.

A major revision of the Program occurred in 1995/96. The major changes that were initiated were as follows:

1. A switch in emphasis from Southeast Asia to Africa. Previous phases of the program had focused resources into the Philippines and Thailand, with smaller programs in Africa. Reflecting the changing needs for research Africa now receives the majority of resources. The first Peanut CRSP projects in Latin America and Eastern Europe were initiated.

2. For the first time in the history of the Peanut CRSP a series of socio-economics projects were initiated. This step was recommended by the panel responsible for the redesign of the program in 1995, and responded to the need to address questions of gender, policy, technology adoption and impact assessment. Prior to this change, only selected projects included limited socio-economic studies.

3. The number of U.S. Institutions participating in the Peanut CRSP increased from four to ten. This change was encouraged by the need to make the program accessible to a greater number of U.S. institutions, and to provide collaboration for expanded HC involvement.

4. To cater to the increased changes in the number of institutions, the program was reorganized from four subprograms housed at participating U.S. universities to 21 projects all coordinated by the Management Entity (ME). These projects were established through an open Request For Proposals (RFP). This change has added a great deal of demands on the ME, but has made performance by the participants clearer, and required principal investigators (PIs) be more accountable for their performance.

Management Entity (ME) Changes.

The ME also experienced a considerable amount of change during the period under review. The most significant changes were:

1. The long standing Director, Dr. David Cummins, retired from the University of Georgia (1998) and was replaced by the Associate Director, Dr. J. H. 'Tim' Williams. Changes in the funding base resulted in the program having to operate with a single full time Director, although the program was designed on the expectation of a two-person management team, including a Director and Associate Director.

2. The ME designed, initiated and implemented an internet based management system. The intention of this network was to increase the efficiency of the ME, and to minimize the reporting and administration burden on the participating researchers and their support institutions.

Funding.

The program was designed around an initial annual funding expectation of $2.3 million which was maintained for the first two years and then reduced to $1.675 million for the third year. Funds were increased to $1.75 million for the fourth year. This change in funding has resulted in considerable disruption of the program since the resources fell far short of requirements set when the program was initiated. This shortfall was particularly difficult to deal with because it occurred during the timeframe when the project PI's were initiating their research plans and activities.

4. <u>Review Process</u>

An EEP is an integrated and mandated part of all CRSPs. The external evaluation by the EEP is most important to the Peanut CRSP operations to assure objectivity in decision making on important and sometimes difficult program and management issues.

Consistent with criteria in CRSP Guidelines, the Peanut CRSP established an EEP for the 2001 Review consisting of five eminent scientists recommended by the Peanut CRSP ME to USAID/BIFAD, and a sixth one as a consultant to the EEP (listed earlier).

The present EEP was established in 1996. The panelists have made several less intensive reviews and observations based on the Peanut CRSP Annual Reports prior to the 2000 Intensive Review including site visits reported in this document. The EEP was charged to investigate the program and make recommendations via this document.

In compliance with USAID and Peanut CRSP needs and expectations, the EEP developed a review process that provided two levels of recommendations:

(1)General recommendations - overall observations, accomplishments, short-comings, and suggested future directions.

(2)Specific recommendations on projects based on a common review and ranking system.

(3)Based on item 2 above, the projects were categorized in order to recommend for each project continuation, substantive adjustments, or discontinuation and replacement.

In support of this review the EEP members were provided with the annual reports for the five-year review, and access to the workplans that resulted in the annual reports. In addition to this information, members of each project were requested to prepare a self assessment for their respective projects, their institutional support, and other factors that may have been significant to the conduct of the project. This information was consolidated by the ME and provided to the EEP.

EEP travel to visit selected research sites (dictated by availability of funds) was arranged by the ME. In most cases the projects were visited in both the U.S. and HC, but not necessarily by the same EEP member. The sites visited were usually by a team of at least two members of the EEP but there were a few cases where the visits were undertaken by a single EEP member. Notes and observations were consolidated through correspondence, internet exchanges and discussion at an EEP meeting held in Griffin, GA (1-4 March 2000). For each project the EEP members and locations visited are described in Table 1 .

Since this review is an important component for supporting the documentation required for a five-year extension of the program scheduled to end in August 2001, it will contain general or overall evaluations and detailed recommendations on each project and activity. The EEP will elude to, or comment on, project management (University of Georgia ME and U.S. participating institutions. A USAID coordinated Administrative Management Review Team (AMRT) will focus primarily on administrative management aspects of the Peanut CRSP at a later date.

Table 1. Project evaluations undertaken by EEP members.

UAB56	University of Alabama	Aflatoxin impacts on immune system.
UGA99	U. Georgia	Fund Management Project
UGA01A	U. Georgia	Extrusion Cooking of Peanut Meal in the Presence of Lysine to Deactivate Aflatoxin and Improve Nutritional Quality.
	Site visit in HC by Duncan McDonald Site visit in HC by Handy J. Williamson Site visit in U.S. and HC by John P. Cherry	
UGA04U	U. Georgia	Development of Peanut Postharvest Handling and Processing Technologies for the Food Industry.
	Site visit in U.S. by John P. Cherry	
UGA05	U. Georgia	The World Geography of the Peanut: Global Networking Approach to Social Equity, Environmental Protection, and Technology Exchange.
	Report evaluation only by John P. Cherry	
NCS07S	NC State	Adoption/Diffusion Processes, Persistence, and Socioeconomic Impacts of New Inputs and Peanut Varieties.
	Report evaluation only by Handy J. Williamson	
VT09S	V Tech	Analysis of Response of Peanut Production in French West Africa: Policy Implications of Currency Devaluation

	Site visit in U.S. and HC by Handy J. Williamson	
PUR10U	Purdue	Effects of Peanut Consumption on Hunger, Ingestive Behavior, Energy Expenditiure and Coronary Heart Disease Risk.
	Site visit in HC by Duncan McDonald	
	Site visit in HC by Handy J. Williamson	
	Telephone Interview by Jeffrey Johnson	
	Site visit in HC by John P. Cherry	
UGA11U	U. Georgia	Development and Transfer of Peanut Processing Technologies in Bulgaria
	Site visit in U.S. and HC by John P. Cherry	
UFL13P	U. Florida	Simulation of Peanut Cropping Systems to Improve Production Efficiency and Enhance Natural Resource Management
	Site visit in U.S. and HC by Duncan McDonald	
	Site visit in U.S. by Geoffrey Hildebrand	
	Site visit in HC by Handy J. Williamson	
	Site visit in U.S. by Ron W. Gibbons - Consultant to EEP	
UFL16P	U. Florida	Development and Use of Multiple-Pest Resistance to Improve Production Efficiency of Peanut.
	Site visit in U.S. by Duncan McDonald	
	Site visit in U.S. by Geoffrey Hildebrand	
	Site visit in U.S. by Ron W. Gibbons - Consultant to EEP	
TAM17P	Texas A&M	Breeding Peanut for Better Productivity and Quality.
	Site visit in U.S. by Duncan McDonald	
	Site visit in U.S. by Geoffrey Hildebrand	
	Site visit in HC by Handy J. Williamson	
	Site visit in U.S. by Ron W. Gibbons - Consultant to EEP	
NCS19P	NC State	Improved Production Efficiency Through Standardized, Integrated, and Enhanced Research and Technology.
	Site visit in HC by Duncan McDonald	
	Site visit in HC by Handy J. Williamson	
UGA22A	U. Georgia	Systems Research to Assess Risk of Preharvest Aflatoxin Contamination and to Develop Technologies to Reduce Aflatoxin Contamination of Peanut.
	Site visit in U.S. and HC by Duncan McDonald	

UGA28P	U. Georgia	Control Strategies for Peanut Viruses: Transgenic Resistance, Natural Resistance, and Virus Variability.
	Site visit in HC by Geoffrey Hildebrand	
	Site visit in HC by Ron W. Gibbons - Consultant to EEP	
AUB30S	Auburn	Production Efficiency and Market Development of Peanuts and Peanut Products for Haiti, Dominican Republic, and Jamaica.
	Site visit in U.S. by Handy J. Williamson	
NCA32U	NC. A&T	Development of Spicy Meat Analogs and Technology Transfer of Value-added Products from Peanuts.
	Site visit in U.S. by Handy J. Williamson	
	Site visit in U.S. by John P. Cherry	
UCN36S	U. Connecticut	Socioeconomic Impacts of Alternative Peanut Production Marketing Systems in Senegal.
	Site visit in HC by Handy J. Williamson	
UGA37	U. Georgia	Training for SE Asian Region.
	Site visit in U.S. by John P. Cherry	
UGA38	U. Georgia	Long and Short Term Training for HC Scientists.
	Site visit in U.S. by John P. Cherry	
UGA39	U. Georgia	Program Support
	Site visit in U.S. by John P. Cherry	
UGA40	U. Georgia	International Collaboration.
	Site visit in U.S. and HC by Duncan McDonald	
	Site visit in U.S. by John P. Cherry	
UGA41	U. Georgia	Management of the Peanut CRSP.
	Site visit in U.S. by John P. Cherry	
UGA46P	U. Georgia	Seed for Disaster Recovery and Development in Groundnut Producing Countries.
UWI49F	University of Wisconsin	Genetic Approaches to Eliminate Aflatoxin Contamination of Peanuts.

TAM50	Texas A&M	Sustainable Enterosorbent Strategies for the Protection of African Populations from Aflatoxin.
UFL52	U. Florida	Development of Sustainable Peanut Production Technologies For Amerindian Villages in the Rupununi Region of Guyana
NMX53	NM State	Valencia Peanut Breeding For High Yield, Early Maturity, and Resistance to Fungal Diseases, and Good Quality
VT54	V Tech	Gender Issues in Aflatoxin Incidence and Control in Groundnut Production Systems of West Africa
FAM51	Florida A&M University	Biochemical and Molecular Responses of Peanut to Drought Stress and Their Role in Aflatoxin Contamination
OKS55	Oklahoma State	Use of chemoprotection in product development to improve safety and production of peanut products in Ghana, West Africa.
UWI49UGA	U. Georgia	See UWI49
UFL16UGA	U. Georgia	See UFL16
UFL52UGA	U. Georgia	See UFL52

5. Observations

Technical Program

- The EEP finds that the Peanut CRSP has made excellent progress in most projects. In these cases the funds invested have resulted in developments consistent with USAID's overall goals and strategic objectives, or will do so in the near future. There have also been significant impacts in the U.S. from the Peanut CRSP program, and continued advances can be expected. The experiments conducted and the results achieved clearly justify an extension of the program for the next 5 years (2001-2006). Many of the objectives established at the beginning of the grant period have been achieved with impact. In some cases, however, the challenges of new environments, new partnerships, and personnel changes have resulted in individual projects not achieving the progress expected and the EEP recommends that these projects be discontinued and the topics be rebid through an open competitive Request for Proposals (RFP).

- The EEP notes that because of the greater worldwide distribution of projects to a larger number of universities and research institutions it became more difficult for coordination of PI's and work among projects. The ME recognizes that program coordinations are the new challenges that the system of more numerous geographically dispersed projects bring to the Peanut CRSP. However, resources to promote better cross-project coordination are limited but have been

partially overcome with the development of a computerized data system and web site implemented by the ME. What is achieved at present largely takes advantage of having coordination meetings while the PIs attend the annual American Peanut Research and Education Society meeting.

Communications

- The Peanut CRSP ME is commended for the development of electronic means to communicate with the Peanut CRSP participants, and to minimize the reporting and administrative burden on both the ME and PI's. The Peanut CRSP is leading the way among the CRSPs in the use of the Web-site to report Peanut CRSP information, project planning, documenting results, budget development, expenditure reporting, etc. In particular, the EEP commends the Director, Dr. J. H. Williams for development of this process. The Peanut CRSP should continue to work to get all the overseas sites linked into the Web system and enhance the use of the computer program by purchasing the necessary hardware and software for all PI's.

Budget and Socio-economics

- Socio-economics projects were added to the Peanut CRSP portfolio in 1996. The increase in budget from $1.7 million to $2.3 million made this addition possible, but the subsequent return to $1.7 million has left the program with a set of activities that could has been sustained with great difficulty. Most projects, and in particular training suffered from this changed circumstance, and from the resulting decrease in project management resources.

Timely Funding

- There is a seemingly ever-present issue with USAID and the University of Georgia on the timeliness of funding for the projects/subgrants to the U.S. institutions. Given the peanut planting seasonal growing calendar any delay impacts projects especially those working on the Production Constraint. Delays are usually due to date of funds availability to the University of Georgia ME from USAID. Added to the problem is that the University of Georgia requires a certain amount of time to prepare documents for transfer to the Subgrant Universities. This also delays funds being available to the HC counterparts. Often this greatly impacts the ability of the scientists to accomplish the project objectives in a timely manner. The impacts are particularly detrimental to field research that is constrained by climatically determined seeding dates, and other seasonally controlled activities. Some projects and institutions may be able to bridge-funds from other resources and minimize the impact to progress, while others cannot. This puts the latter institutions at a disadvantage when progress is measured against the former institutions. The EEP encourages that USAID, University of Georgia, Peanut CRSP and the funded institutions make every effort to ensure timely availability of monies for the program.

2. <u>Achievements and Impacts.</u>

The achievements of the Peanut CRSP over the past four years have been substantial. The EEP notes that the Peanut CRSP continues to make good scientific achievements, which either already do or shortly will, result in the clear and significant impacts in both the U.S. and HC's. Among the many accomplishments and impacts the EEP wants to draw attention to those listed

below:

Technical.

1.

The research conducted at Purdue University (Project PUR10U) and the Food Research Institute in Ghana, has shown that the high energy content of peanuts is offset by the high satiety value of the commodity. This means that consumers are not at higher risk for obesity and cardiovascular risk from a high caloric intake of peanuts. The research has also contributed to the body of knowledge showing that peanut oils are healthy and have positive cardio-vascular health benefits.

This research has received attention in the U.S. where it has been used to promote peanut consumption, which has helped reverse a 5-year (18%) decline in consumption. One industry representative states that U.S. consumption of peanut has increased 13% since this research began and the impact has been estimated to be worth as much as $500 million annually. In developing countries and for USAID's humanitarian response efforts, the information that peanut is a very hunger satisfying food, with high protein, high energy suggests that this crop should be exploited more in times of civil crisis and famine since more hunger prevention is delivered per payload than from the commonly used emergency rations.

2.

Research on germplasm of Bolivian origin (Project UFL16P) in Florida, Georgia and Bolivia has resulted in the identification of new sources of resistance to the Tomato Spotted Wilt Virus (TSWV) disease which has become one of the most limiting diseases in the U.S. These lines also have multiple resistance to foliar diseases and other prevalent diseases in the U.S. as well as having high yield potential. A breeding program to exploit this opportunity has been initiated and advanced lines are now available.

In Bolivia the research has shown that productivity is limited more by management and labor availability than by genetic potential. Labor saving technologies for harvest have been proposed and are being developed. Extension documents to promote improved management have been prepared and production is starting to increase.

3.

In Malawi, the Peanut CRSP (Project UGA28P) is focused on developing and exploiting virus resistance has supported the testing of lines resisting to the Groundnut Rosette Virus (GRV) disease developed by ICRISAT. These lines are now being released and are being multiplied for distribution to farmers, with support from the USAID Malawi mission. The potential benefits to Malawi farmers are the elimination of rosette epidemics that decimate production every 5-7 years. This will provide greater food stability, higher mean yields and encourage more farmers to produce peanuts since the risks of loss will be decreased.

Studies of GRV variability across Africa indicate that resistance based on viral coat-protein of the GRV assistor virus should be stable and research in Georgia has produced transformants using a synthetic gene.

4.

In Senegal a cultivar (Fleur 11) developed by ISRA scientists (Project TAM17P) is being adopted by farmers. On farm socioeconomic studies by another Peanut CRSP project (UCN36S) shows that farmers find this line maintains it's 25% yield advantage over the established variety. Presently, adoption is limited by seed volumes, but the potential impact will be an additional $18 million annually to the peanut farmers in Senegal.

The release of a second improved variety is imminent.

5.

In the Philippines 35% of children are deficient in vitamin A. This situation causes blindness and decreases child survival. Market research conducted with Peanut CRSP support (Project UGA04U) has shown that peanut butter is consumed by all sectors of the population, a fact that makes it an ideal vehicle for micro-nutrient health interventions.

Working with commercial peanut processors, the scientists supported by the Peanut CRSP (UGA04U) developed a vitamin A-fortified peanut butter. This product has been commercialized and now has a 35% market share in the Metro Manila area and is sold nation wide. Commercial competition is encouraging other peanut processors to develop competing products.

6.

Liver cancer rates in Southeast Asia are 36 times those observed in the U.S. Aflatoxin and hepatitis B interact to greatly increase the risk of this cancer in these areas. Researchers in the Philippines on Peanut CRSP (Project UGA04U) working with a peanut-based food industry have developed sorting techniques to control aflatoxin contamination. This has allowed companies to exploit the world wide market opportunities for ethnic Filipino sauces and expand food processing operations. Production has increased 40% in the year since the technology was deployed, and other companies are positioning themselves to adopt this technology.

The impact of widespread adoption of this technology will be less aflatoxin-contaminated peanut foods in the Philippines, and therefore a healthier population. Commercial competition will ensure widespread adoption of the technology.

7.

Consumer market research in Bulgaria has shown that a strong market of peanuts and peanut products can be developed. The Peanut CRSP (Project UGA11U) has helped establish a food processing pilot plant in Bulgaria to allow local industries to scale up their operations, by providing training to technicians making them familiar with the major peanut processing technologies.

8.

Scientists in the U.S. on Peanut CRSP (Project UGA04U), have transferred the technology of a peanut snack product that is successful in the Philippines to the U.S. market. A North Carolina peanut company is test marketing the snack product.

9.

Peanut CRSP supported research (Project NCS19P) contributes to the pest advisory system that is currently the basis for integrated pest management recommendations for peanut farmers in North Carolina. This system maximizes farm profitability and minimizes environmental damage through the elimination of unnecessary pesticide applications.

10.

Basic research at Texas A&M University (Project TAM33A) supported by the Peanut CRSP has identified two genes that are critical to the production of aflatoxin by *Aspergilli* fungi. These genes may allow the use of molecular engineering techniques to eliminate or greatly diminish aflatoxin contamination of peanuts when infected by the fungus.

11.

A centralized collection of 'grey' literature recording peanut research in national programs across the world has been started. This information is being made available through a web site accessible database (Project UGA05). The Arachis International Newsletter is now published in both electronic and paper mediums (Project UGA40).

12.

The Peanut CRSP has established an impact assessment and adoption program (Project NCS07) as part of the new socio-economics thrust. On the other-hand technologies for

production adopted by the farmers as part of the peanut package have continued to be used.

In the Philippines, Peanut CRSP cultivars are being planted more in the major peanut region, and their use is a major component of the Philippine's Government agricultural programs. The EEP encourages the Peanut CRSP to continue and expand the important work of this project.

13.

Socio-economic research in Senegal (UCN36S) mobilized ENEA to focus on economic problems in farm level peanut production. The University of Connecticut has been involved with this development over a 10-year period. The research has determined that the pricing policies, fiscal practices, and market structure measures followed by the government of Senegal are not fully serving the peanut sector of the country. Additionally, it has been offered by the researchers that the key to future success will be farm level efficiency, environmental quality, high seed quality, and input to enhance productivity. The project has encouraged positive interaction between ENEA and ISRA, which has more fully contributed the strengths of ENEA to the agricultural sector.

14.

Publications:

Publication Type	
Power Point	0
Journal	236
Chapter	6
Book	3
Thesis	44
Report	53
Abstract	145
Proceedings	94
Verbal	1
Other	69
Training Manual	1
Monograph	3

Newsletters	0
Totals	669

Training:

Training Type	Female	Male	Total
Short Term	28	39	67
MSc	52	54	106
PhD	26	40	66
Other	0	5	5
Workshop	0	0	0
Totals	108	141	249

Workshops and Training Courses Supported: