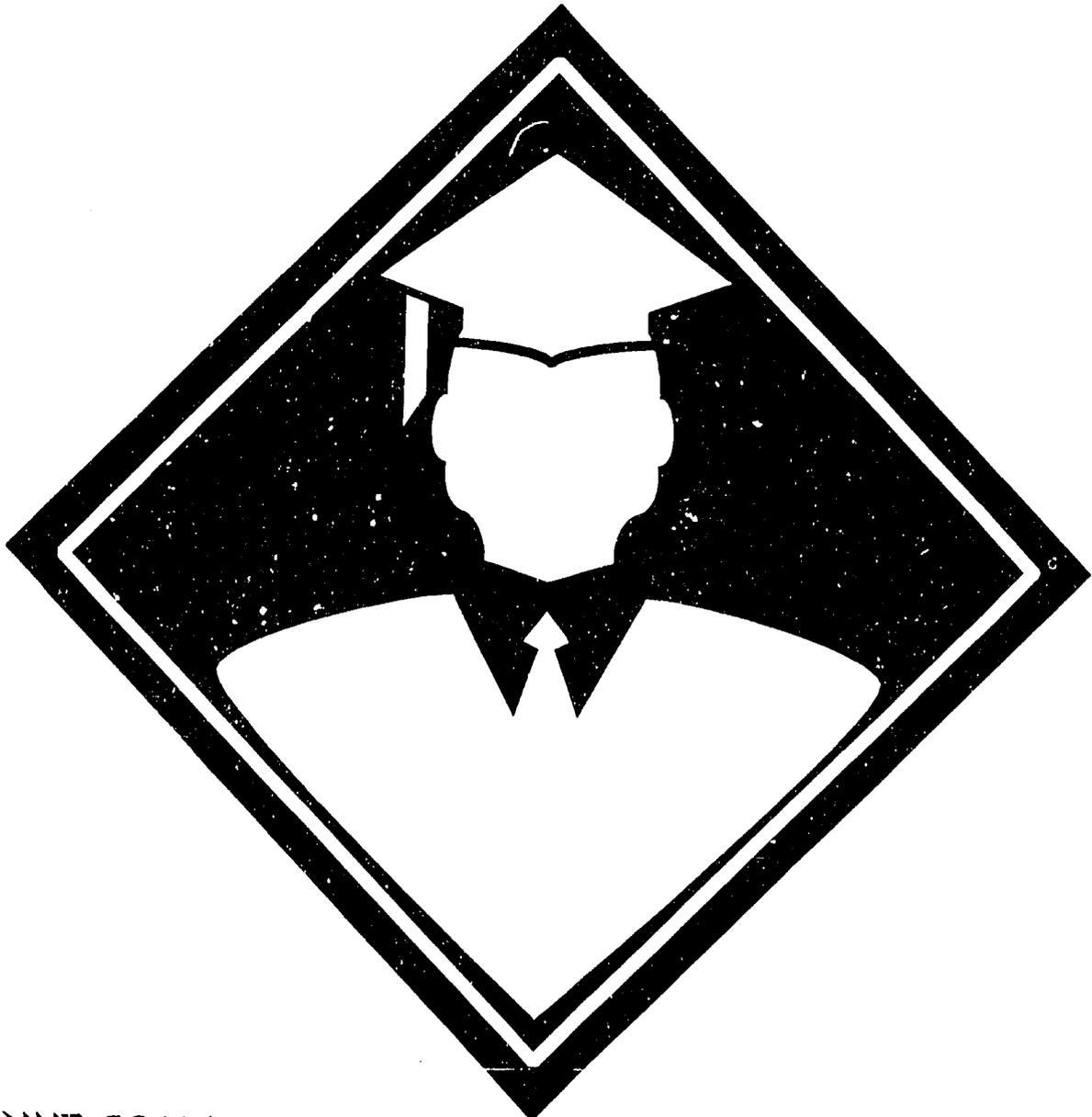


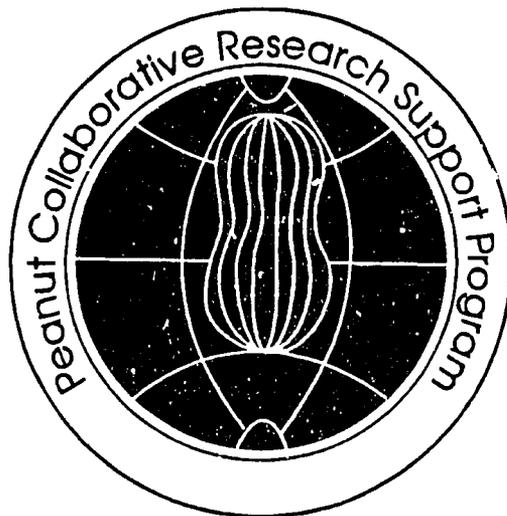
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Socioeconomic Impacts of Peanut CRSP Graduate Training Efforts



PEANUT COLLABORATIVE RESEARCH SUPPORT PROGRAM



The Peanut Collaborative Research Support Program (CRSP) is funded through Title XII-Famine Prevention and Freedom from Hunger, under the International Development and Food Assistance Act Amendment of 1975. It is implemented by the United States Agency for International Development (USAID), through USAID Grant DAN-4048-G-00-0041-00, and the participating U.S. universities and host country institutions. USAID/Egypt Grant No. 263-0152-G-00-1019-00 supports a program in Egypt. The Board of International Food and Agricultural Development and Economic Cooperation provides an advisory role to these groups in implementation of the Peanut CRSP.

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**SOCIOECONOMIC IMPACTS OF PEANUT
CRSP
GRADUATE TRAINING EFFORTS¹**

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PREFACE

In order to help attain the goals of the Title XII Program of the United States, activities to improve the research capability of both developing countries and U.S. institutions by the Peanut Collaborative Research Support Program (Peanut CRSP) are in progress. Among the many problems affecting sustainable production and utilization of peanut are inadequate transfer of technology and a lack of enough trained researchers and support personnel. Increasing research capabilities of developing countries through supporting selected students to attend university academic degree programs in the U.S. is one of the strategies being implemented. Under the Peanut CRSP auspices, students have been selected and trained at North Carolina State University, The University of Georgia, Alabama A&M University, and Texas A&M University.

This is a study of the socioeconomic impacts of the Peanut CRSP degree program through its students. The study was based on information when the program was seven to eight years old and former students were just becoming established and productive following training. The study was supported by USAID Grant No. DAN-1310-G-00-0045-00 to Michigan State University (MSU), and Bean/Cowpea CRSP for impact studies by several CRSPs. A subsequent subgrant from MSU to The University of Georgia provided funds for a subgrant to North Carolina State University to conduct the socioeconomic impact study. We acknowledge the cooperation, support, and interest of the Department of Sociology and Anthropology at North Carolina State University in conducting the research reported.

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ABSTRACT

The socioeconomic impacts of the Peanut CRSP graduate training efforts were measured by an international mail survey of graduate students who were sponsored by the Peanut CRSP in degree programs at four U.S. universities. Fifty-one questionnaires (or 73%) were returned by respondents despite the difficulties of overseas mailings and often incomplete addresses. The findings indicate that the respondents were mostly foreign, male (52.9%) students who majored mainly in food science (29.4%) and breeding/genetics (23.5%). Seventy-one percent of them have completed their academic training and spend most of their professional time doing research in government or university settings.

The survey results contain a number of indicators of socioeconomic impacts. For example, respondents have already produced a total of 94 publications and over 80% indicated their research had been applied in their home country. Over three-fourths of the former students thought their education was "very useful" in their present employment, 67% reported applications of their "training," and between 29% and 56% indicated indirect impacts of their training in a number of different ways.

The United States benefited from the CRSP training effort as well. For example, thesis research applications in the U.S. were reported by 72.7% and many of the students helped with U.S. research projects while studying here.

It appears that the Peanut CRSP program has been very effective in terms of manpower development and research capability enhancement. The evidence in the details of the survey also points to many applications of research and training in both the foreign nationals' home countries and the United States. One unusual characteristic of this particular higher education program is the absence of the "brain drain" phenomenon. All of those with completed degrees have thus far returned and remained in their home countries. A few criticisms and suggestions for improving the Peanut CRSP university degree program were mentioned by respondents and are discussed in the latter section of this report.

SOCIOECONOMIC IMPACTS OF PEANUT CRSP GRADUATE TRAINING EFFORTS

INTRODUCTION

The Peanut Collaborative Research Support Program (CRSP) is a long term research effort with goals of alleviating constraints to worldwide sustainable production and utilization of peanut. The CRSPs were created to implement the Title XII Program of the United States Foreign Assistance Act Amendment of 1975, with a goal to prevent famine and establish freedom from hunger through land grant university involvement in international development. In order to attain these goals, the research capability of both developing countries and U.S. institutions are being enhanced through training and support of research.²

The Peanut CRSP, initiated in 1982, is designed to address a number of constraints to sustainable production and utilization such as low yields due to unadapted cultivars and yield losses due to infestations of insects, diseases and nematodes. Among the other constraints addressed are inadequate transfer of technology and insufficient numbers of trained researchers and support personnel. Efforts to relieve the latter two constraints have been fostered through the CRSP graduate training program. The aim is to generate solutions to current problems and improve research capabilities for effectively addressing future problems. While increasing research capabilities through degree training is an integral part of this effort, U.S. scientists also gain knowledge and acquire important elements, such as germplasm, from other countries through this program. Students have been trained at all four of the U.S. institutions participating in the Peanut CRSP: North Carolina State University, The University of Georgia, Alabama A & M University, and Texas A & M University.

²The Peanut CRSP is funded through TITLE XII--Famine Prevention and Freedom from Hunger, under the International Development and Food Assistance Act Amendment of 1975. It is implemented by the United States Agency for International Development (USAID), through USAID Grant DAN-4048-G-00-0041-00, and the participating U.S. universities and host country institutions. This research was supported by the Peanut CRSP Management Entity Office, The University of Georgia through Subgrant No. PO 9122942, NCS/IS MSU-309-007, titled "Socioeconomic Impacts of the CRSP Technology in the U.S. and Selected Countries".

Sommers (1967) has suggested that efforts for improving human development have ranged in scope from attempts to develop human beings, to attempts to develop human resources, to attempts to develop manpower. Programs to improve human beings are the broadest and include concerns of social science for areas such as education, training, health, and environmental aspects. Manpower development is the narrowest and involves policies or programs "that increase the worker's productivity or increase his mobility so that he makes a greater productive contribution in the labor market and at the same time increases his own earnings and welfare" (Sommers, 1967). The Peanut CRSP graduate student support effort will be reviewed with the realization that it is a program for manpower development only.

Investigations such as the present one are rare. Studies which follow students after graduation to determine outcomes are generally referred to as "tracer" studies. References to only four tracer studies could be found in the literature (Institut Teknologi Mara, 1980; Sullivan, 1981; USAID, 1977; USAID, 1981). Only two of these appear to be even somewhat similar to the present study (USAID, 1977 and USAID, 1981). The *Tracer Study Guidelines* (1983) prepared by George Psacharopoulos for the Education Department of The World Bank proved valuable in our design of the present instrument. Many of the existing tracer studies are cited in these guidelines.

This report studies the extent of CRSP impacts on manpower development especially through the training of U.S. and foreign research scientists at the cooperating CRSP institutions in the U.S.. The Peanut CRSP has supported 101 graduate students most of whom are foreign nationals recruited through the Peanut CRSP contacts with professionals in participating countries. Some students are still completing their educations. Most have completed their educations and have returned to their home countries. Part or all of their education and research has been funded through the program. This study is based on a survey designed to assess the CRSP program's impacts on the students' educational and professional experiences, and contributions to agricultural development efforts, both here and abroad.

SAMPLE, RESEARCH DESIGN, AND PROCEDURES

The target population of this research included all the graduate students who have been sponsored by the Peanut CRSP Program in degree programs. Almost all of these have completed at least one degree, although some masters students are continuing to work towards a Ph.D. This population sample does not include CRSP students in other support categories (Post Doctoral, Sabbatical, or short-term training).

Since a complete list of the student participants was not available, the sampling frame had to be compiled from various CRSP sources. The sources include the annual CRSP reports of the four participating universities (North Carolina State University, The University of Georgia, Texas A & M, and Alabama A & M), the departments in which these students majored, and the Management Entity Office of the Peanut CRSP located at the University of Georgia. The sampling frame consisted of 101 names of students who had been enrolled in degree programs through the Fall of 1989. Of these, 68 personal current addresses were known by the CRSP Program or were discoverable by the research team. Two foreign institutional addresses were added bringing the total sampling frame to seventy addresses.

The mail survey was considered an appropriate method of data collection given the international geographic dispersion making phone calls expensive or impossible. The high education levels of the respondents suggested high written survey capabilities. The survey was constructed to determine the demographic characteristics of the students going into the CRSP sponsored training, the nature of their training, their status after the CRSP sponsored training, and the impacts on productivity and dissemination of their CRSP training and research activities. Both open-ended and closed questions (multiple choice) were included in the survey to collect qualitative and quantitative data. Two mailings and selected follow-up phone calls where feasible were used in an effort to keep the return rate as high as possible.

Given the relatively small population size, we did not draw a sample from the sampling frame. Every address on the sampling frame was sent a survey. To the extent, therefore, that our sampling frame matches the population, we have conducted a population, rather than a sample, study. For the respondents who presently reside in the U.S., a stamped return envelope was included in the survey. This was not an option for the overseas respondents. The inability to do so was explained and reimbursement was offered. For several students who did not have home or business addresses, but are affiliated with the University of Ouagadougou in Burkina Faso and Kasetsart University in Thailand we mailed surveys to our University contacts' addresses. We requested that the institutions distribute and collect the surveys. All of these measures were designed to improve the response rate.

One month after the first mailing we distributed the second mailing and the response rate from the two mailings was sixty-four percent [45 out of the 68 personal and two institutional addresses ($n = 70$)]. Six of the 25 nonrespondents were subsequently identified by the Management Entity Office of the Peanut CRSP as well-known participants in the program whose addresses were also available. A follow-up effort was conducted to solicit their returns. All 6 returned their completed surveys shortly thereafter, bringing the total number of returns to 51 (a 73% return rate). Since these 6 respondents received an additional mailing, they were analyzed separately in an effort to detect possible bias. Where no differences between these six returns and the larger sample of 45 were detected, all 51 cases were included in the tables. The discussion of the findings notes where differences were detected. Based on state-of-the-art techniques, survey methodology experts indicate that a well-done U.S. survey should yield a response rate of about 70% (Dillman, 1978). Given the added international mail difficulties, a lack of complete addresses for some, and lack of ability to make follow-up phone contacts with all the respondents, 73% represents a reasonably good response rate.

THE SURVEY INSTRUMENT

The survey instrument contained 37 questions including 28 multiple choice or short answer questions, Examples, of short answer

questions are: "Age?", "Name of Employer?", and "Title of Present Position?". Nine questions were open-ended allowing the respondents to give as much information as they chose. Examples, of the latter questions are: "What problems, if any, did you have in obtaining employment after graduation?", "What applications of the thesis, if any, were made in your home country?", and "How was the technology associated with CRSP training modified, if at all, for local conditions?".

Several questions contain answers reducible to a single figure such as an average and are reported in the text but are not reported in the data tables (for example "age" and "months in graduate school"). Some open-ended questions are directly quantifiable (e.g., counting the number of publications) or indirectly quantifiable in terms of simply counting the number responding or not responding (e.g., "any applications of thesis?").

Multiple choice questions and those which were quantifiable are reported in the tables attached (Appendix) to the narrative report. Only the questions which were deemed directly related to the impact of the CRSP on students and their subsequent activities are included in this report. Others will be used in later, multivariate sociological analyses which will attempt to take into account factors affecting individual differences in outcomes among students (e.g., "size of community", "gender", and "current socioeconomic status").

GENERAL DESCRIPTION OF RESPONDENT SAMPLE

About thirty-seven percent of the students (37.3%) are from the United States. Fifteen (29%) of the CRSP-trained respondents are continuing their education rather than taking jobs. The latter is a somewhat limiting factor for this study, since the post-graduate impacts through subsequent employment activities cannot be assessed. Of course the impact of their masters thesis, research while at the university, and other activities at the masters level are still relevant even though they may be continuing their Ph.D. work. Thirty-two (63%) students listed completed theses.

The respondents' average age is 33.4 and they spent on the average 31 months doing graduate work supported by CRSP. For those who are no longer students, it had been 2.3 years on average since completing their degrees at the time of this survey.

MAIN SURVEY FINDINGS

The tables for the main survey findings are found in the Appendix. In Table 1 we have the results of the question regarding the students prior citizenship before coming to the United States. Seventeen countries are represented. The country represented most often besides the United States was Thailand with 8 students (15.7%). The Philippines was the third country with 7 (13.7%). Fourteen other countries had at least one student in the CRSP program.

In Table 2 it is noted that only 14 students (27.5%) came to the United States on CRSP sponsorship. All six respondents who received the last mailing came to the U.S. on CRSP sponsorship. One possible reason why relatively few students were brought to the U.S. under CRSP sponsorship is that over thirty-seven percent (37.3%) are from the United States and were already here. The CRSP program also recruited some foreign students while they were here in the United States.

In Table 3 we see that 47.1% of the sample are female students. This is unusual given the general difficulty which women in many underdeveloped countries have in obtaining various types of equality, including education equality (Moxley and Wien, 1969).

Table 4 indicates students' primary specialization in graduate school. Food Science was the specialization of choice with 29.4% choosing it. Breeding/ Genetics was second with 23.5%. Crop Science and Microbiology were the next most popular choices with 13.7% and 11.5%, respectively. Toxicology was next, followed by Entomology, Biotechnology, and Plant Pathology.

In Table 5 we learn which university the students attended. The greatest number of respondents attended North Carolina State

University (43.1%). The University of Georgia was second with 35.3% followed by Texas A & M (15.7%) and Alabama A & M (5.9%).

Table 6 indicates the former students' current employment status. "Student" is the category indicated by 29.4% (n=15) with an equal number indicating that they are university employees. In third place is "private employment" followed by "government employment" and only two (2) are "unemployed" (3.9%). Tables beginning with Table 7 through Table 17 are relevant only to those who have had some employment. Thus, between 15 and 17 respondents did not reply or responded "not applicable" to questions in Tables 7 through 17. (Fifteen remain as full time students and 2 are currently unemployed.)

Table 7 indicates the degree received during CRSP training. Among those who are not currently "students," 47.2% received the MS Degree, while over half (52.8%) received the Ph.D. (The 15 "not applicable" are currently enrolled students).

Table 8 indicates how the 34 employed students' professional time is now allocated. Most of them spend the majority of their time (56.2%) doing research. Teaching activities are second (13.9%) followed by administrative activities (11.7%), service (10.0%), extension (5.3%), and policy activities (2.6%). Only 3% listed "other" (i.e., indicated that their professional time was spent in other activities not mentioned in the survey list).

Table 9 indicates what the former students thought about the usefulness of their university education with regard to their present employment. Overwhelmingly they thought their university education was "very useful" (80.6%). Only one (2.8%) gave a negative response.

Tables 10 through 14 indicate specific impacts which the 34 employed respondents felt their university education had on their present employment. Table 10 indicates that almost half (44.1%) feel there was a positive impact on their income and 55.9% indicate a positive impact on promotion (Table 11). Over half (55.9%) indicate a positive impact on their own productivity (Table 12) and 29.4% indicate some impact on their co-workers' productivity (Table 13). Only

21.2% indicate that there is some other positive impact on their present position which was not covered by the survey (Table 14).

Table 15 indicates whether there was an application of their "thesis" or "dissertation" in their home country. Over 80% indicate there was such an application (81.8%). Over sixty-eight percent (68.8%) were able to give at least one specific example (Table 16). For 15 students this question was not applicable due to a lack of degree completion.

Table 17 indicates whether some technology associated with their CRSP training has been modified for local use. An affirmative response was given by 33.3% of those who responded. (Twenty did not respond, but we know that 15 are still in school and 2 are unemployed.)

Table 18 indicates whether the student could give a specific example of the use of their "thesis research" which had been applied in the United States. A positive response was given by 72.7%. Only six did not respond since the question does not imply a completed thesis. Therefore, it should be noted that all of the respondents (regardless of student or unemployed status) are relevant respondents in these remaining tables. The base figures for these tables (Tables 18-24), therefore, is 51 rather than 36 (15 being current continuing students).

Table 19 indicates whether respondents were able to give an example of a potential use of their CRSP training for the United States and their home country. Examples of such applications were given by 89.1% of the respondents.

Table 20 indicates in what ways the respondents CRSP training has been shared. This question allowed for multiple responses and, therefore, the proportion of responses does not total 100%. The most frequent indication of sharing is through publications (80.0%). The second most often mentioned method of sharing is through co-workers (77.6%), followed by sharing through conferences (67.3%). Other agencies and training programs constitute 28.5%. Only 4.1% indicated there had been no form of sharing of their CRSP training.

Table 21 indicates the students' overall satisfaction with CRSP training. Over fifty-eight percent (58.3%) indicated that they were "very much satisfied" with their CRSP training and another 39.6% said "fairly much satisfied." Only one respondent (2.1%) gave a negative response.

Tables 22 through 24 indicate responses to the request to list publications, reports, research, and research projects that have been worked on since graduate training. Table 22 indicates that 51.0% reported publications. A count of all the publications listed totaled 94 for an average production rate of 1.84 per respondent. Table 23 indicates that 70.6% reported abstracts or reports during or since their training. A count of reports and abstracts listed indicated a total of 119 for an average production rate of 2.3 per respondent. Table 24 indicates that 84.3% worked on research projects during or since their training. A count of the different kinds of projects mentioned indicated 168 total projects worked on by the 51 CRSP students for an average of 3.3.

SUMMARY OF ANSWERS TO OPEN-ENDED QUESTIONS

The following section describes the general nature of the responses to open-ended questions in the tracer study survey.³ Respondents showed great variation in the amount of information and detail given.

The first open-ended question (Question 16) asked students which subjects studied were most useful in reference to their present employment. There were 37 respondents and 74 responses. Considering their assumed connection with food science and breeding/genetics occupations, it is surprising that the subject most often mentioned as "most useful" was "statistics" (11 responses). This may indicate that statistics is a more basic (less specialized skill) with wider applications than other courses taken. "Plant breeding" was the second most often mentioned course (8 responses). Some type of

³A complete list of all respondents' statements is available from the authors.

chemistry was the third choice (7 nominations), while plant pathology was fourth (5 nominations). "Quality control" and "microbiology" tied for fifth. The remaining courses were not mentioned by more than one or two students.

Another question (Question 22) requested that students list the topic of their thesis. Thirty-eight students responded to this question with 35 giving titles of their theses. Three gave descriptions of the research area. Nine of the theses dealt with nutritional uses of peanut. Most of the remaining theses involved basic research on the peanut plant itself with three focusing on plant breeding and ten on plant diseases. Others dealt with a variety of basic research and applied research topics related to the plant itself, or growing and harvesting conditions of peanut.

A follow-up question (Question 23) deals with the application of the students' theses or dissertations research to their home country. Question 22 previously had requested the title of the dissertation and 35 titles were given. There were 28 responses to question 23. The most often mentioned applications were "Peanut breeding to satisfy demand for various improvements" and "Leafspot and disease resistance screening techniques for peanuts." These were mentioned by a total of ten respondents. "Peanut flour as a food supplement" was mentioned by two students and "expanding use of peanut meal as feed or high protein source" was also mentioned by two students. All other examples of applications were mentioned only once.

A subsequent question deals with examples of how CRSP training was used in their home country (Question 24). Twenty-three people responded to this question and most of the examples given were oriented to research (18). Four of the responses dealt with practical applications such as "the advantages of intercropping peanuts with coconut," "the use of a peanut lifter to harvest peanuts," and "peanut meal as a protein source and extruded square feature dog food." Two examples were unrelated to peanuts. These were "consumer testing" and "consumer questionnaire development". One reason that more respondents did not answer this question could be due to the unexpectedly large number (19) of the CRSP participants who were from the U.S.. As noted by more than one of these U.S.

participants, they did not respond to this question because their answers would overlap answers to Question 26 which asks for applications in the U.S.

Another question (Question 25) asks about technology associated with CRSP training which has already been modified for local use. There were 18 responses. Some said that this question does not apply to their current situation. A few claimed that the technology is already appropriate for local use and no modification is needed, but others did give examples of how the technology has been modified. Three of the modifications are: (1) "instead of using artificial shade, actual tree shade is being used in the Philippines," (2) "processing without sterilization because the university cannot afford to buy glass bottles (using plastic)," and (3) "the use of a simple and inexpensive package and simple technique to measure stability of roasted peanuts."

A question regarding "Applications of Thesis/Dissertation in the U.S.?" has one of the higher response rates (Question 26). There were 33 examples given. Several examples refer to the application of peanut breeding in the United States. Most of the other responses are more detailed and technically oriented. There is little overlap between the responses. Six examples of applications are: (1) "manipulation of Lactic Acid Bacteria," (2) "screening of peanut breeding lines for *A. flavus* resistance," (3) "development of Chemisorbents for Aflatoxin," (4) "interspecific hybrids used to develop breeding populations with disease and insect resistance," (5) "evaluation of toxicities of biological control agents," and (6) "help set up IPM strategies for peanut insect pests in Georgia."

A question regarding potential use of CRSP training for the U.S. and home applications is relevant to both foreign and American students (Question 27). Therefore, it is not surprising that it has the highest response rate (41 responses giving potential uses). Only 9 people did not respond to it and one person said it is inapplicable. However, the technically oriented responses do not differ considerably from the responses to the previous questions. Eight of the responses regarding applications which seem to differ from the previous ones are: (1) "how to supervise workers or technicians," (2) "using consumer

research techniques to develop products to meet the needs of consumers," (3) "teaching and advising graduate students from overseas," (4) "technology development and transfer to peanut growers," (5) "professional skills and status needed to carry out projects in Niger in a high level government position," (6) "increase plant productivity and food quality," (7) "ways to get more funds and money for research," and (8) "optimum timing of insecticide application and action threshold of thrips on peanut."

A question asking for examples of CRSP training or research used in the United States yielded 29 examples (Question 28). A few respondents did not give examples, but asked the reader to refer to previous responses, their publications, or their thesis or dissertation topics. Several of the examples that are provided do not differ significantly from responses in earlier questions. Seven of the more innovative examples are: (1) "field studies using *Bradyrhizobium sp.* (arachis) NC 92 nif minus mutant are being done to examine the cause of the increased yield between this strain and certain peanut cultivars," (2) "selection and breeding of genotypes resistant to *A. flavus* [aflatoxin], (3) "development of a recurrent selection program to combine different components for resistance to leafspot," (4) "my crosses are being investigated in the field to select early maturing lines," (5) "peanut breeding program has released a new early maturing cultivar and my work contributed to that," (6) "the AUDPC [Area Under the Disease Process Curve Technique] has been used in the USA for screening peanut leafspot disease resistance and forecasting the development of leafspot disease in the fields," and (7) "it is helping in the screening of various aluminosilicates, and in the design of selective sorbents for the binding of mycotoxins."

Another question deals with the weaknesses of the CRSP training program and suggestions for improvement (Question 36). There were 36 responses to this question. The most frequent theme is the lack of knowledge of the Peanut CRSP Program. Many of the respondents claim that they do not know much about the Peanut CRSP. There are indications that there has not been enough communication between the program and the students who are involved. Also, there appears to be a desire for more interaction among those students who are supported by CRSP and also with the

university professionals who are involved with CRSP. One respondent says that they themselves did not realize they were sponsored by CRSP until they received this survey. A few other respondents feel that the financial policy of CRSP poses some problems. Some feel that the funding is not enough to sustain minimum expenses which they feel should include health and accident insurance and expenses to cover a spouse and children. Another says that there have been occasional delays in receiving funding which has caused problems in the lab and a great deal of anxiety. One suggests that the CRSP should consider supporting fewer students who would receive better funding.

The remaining weaknesses were not mentioned by more than one respondent. Nevertheless, some comments may help improve future efforts. One respondent felt that CRSP overly emphasizes technical aspects of training and ignores the important aspects of socioeconomic understanding and socialization. This person suggests that some of the professors need to improve in human relationships, especially with foreign students. Another student does not agree with the CRSP policy of sending varieties to host countries for testing. This student believes that the host country should start developing these varieties. Another respondent felt that the monetary funds were too limited to cover expenses involved in conducting and developing IPM strategies in Burkina Faso. One student complained that, "there was insufficient communication between administrators at UWI and Peanut CRSP coordinators at AAMU, and that there was a general unwillingness of administrators at UWI to assist with utilizing the skill acquired and the results of research done locally." Another respondent stated that there was a lack of adequate equipment to conduct research such as leaf area meter, computer, control chamber, etc. Finally, it should be kept in mind that 15 respondents saw no need to suggest any criticism or ways for improving the program. Also six of the 36 respondents to this question actually gave no criticism or suggestions for improvement, but made other comments such as "I wish CRSP would work in eastern Brazil," or "Peanut CRSP may not have enough money to train more people in graduate studies but the few you have trained are an asset to their countries." In other words, 41.2% could think of no single criticism or suggestion to improve the program they were in.

A final question asks about major strengths of CRSP training and the CRSP program (Question 37). There were 39 positive responses. This was the second highest response rate of any of the open-ended questions. This is more impressive since this is the last question in a time-consuming questionnaire, the point at which the fatigue factor should curtail responses. Even more striking is the length of various responses to this question. One of the responses ran 15 typed lines. The total lines of response to this question for all respondents is easily double the lines of response for all other open-ended questions. In technical terms, the quantity (34 responses), the direction of response (positive), and the intensity (number of lines written) suggest that respondents are overwhelmingly satisfied with the CRSP program. The strengths listed overlapped extensively. Included were statements about the enhanced possibilities for collaboration, professional growth, and direct contact with participants in the program.

As mentioned earlier in this report, six of the 25 nonrespondents (24%) were identified by the Management Entity Office of the Peanut CRSP as important participants and they were sent an additional mailing. All six of these participants submitted completed questionnaires. We initially compared this group with the original 45 respondents to make sure that they were not significantly different before including them in the final tables.

These six respondents were similar to the first 45 respondents on most of the responses. They differed from the original group only in terms of their method of recruitment to CRSP, their degree received under CRSP funding, their present jobs, the perceived impact of their training on productivity, their satisfaction with CRSP, their publications, and their propensity to be more verbose in their open-ended responses. In particular, these six respondents were more likely to be brought to the U.S. under CRSP sponsorship (100% versus 18% for the original 45 respondents), receive the Ph.D. (100% versus 33%), spend more of their current professional time teaching (35% of time versus 10%), perceive an impact on their own productivity (83% versus 50%) and on their coworkers' productivity (50% versus 25%), be "very much satisfied" with their CRSP training (100% versus 54%), list more publications and reports (an average of 2.7 versus 1.7 and 4.3 versus 2.1, respectively), and more likely to list both weaknesses and

strengths of the CRSP program (83% versus 51% and 83% versus 78%, respectively.) On all the other 31 variables, this group was indistinguishable from the original 45 respondents. Some caution, nevertheless, is warranted in interpreting the tables, especially in those tables where differences are noted above.

As in any survey, evaluation of the results is tempered by a consideration of nonrespondents (19 participants did not respond). Inclusion of data from these 19 (27% of the sampling frame) could have produced slightly different findings from those reported here. In addition, while many of the findings are impressive (e.g., the productivity levels), the lack of a comparison group prevents an assessment of the degree to which training enhances productivity. The findings do suggest that the CRSP program does not produce a "brain drain" effect, does not seem to produce gender inequities, produces employable and productive applied scientists, and produces knowledge that is shared and used in agricultural development efforts both in the home countries and the United States.

SUMMARY AND CONCLUSIONS

The study began with the names of 101 graduate students which have been supported by the Peanut CRSP program. Only 70 addresses could be obtained, but 51 completed questionnaires were returned (a 73% return rate). The results of the survey indicate a substantial contribution to manpower development.

Evidence based on this survey indicates worker mobility and increased earnings and welfare. Also there has been a surprising degree of productivity given the short time graduates have been working (2.8 years) and the number who are continuing their studies (29.4%). These 51 students have produced or collaborated on 94 publications, 119 reports or abstracts, and 168 research projects. Fifty-six percent report that the CRSP sponsored training positively impacted their productivity, 55.9% their promotions, and 44.1% their income. Over three-fourths of former students (80.6%) thought that their university education was "very useful for their employment."

Applications of thesis research were reported to have occurred in their home country by 81.8%. Applications of CRSP training in the U. S. or home country were given by 89.1% of respondents. Between 67% and 80% indicated indirect impacts of their training through the sharing of their knowledge or skills in a variety of activities such as working with co-workers, conferences, and publications.

The U.S. is also a major beneficiary of this CRSP effort with 72.7% reporting examples of thesis research applied there. Examples of applications of their training for the U.S. and/or their home country were given by 89.1%.

The areas identified by respondents as needing some attention by the CRSP program are communications about the CRSP program to the students, communication and contact between and among CRSP sponsored students and faculty, and more attention to possible feelings of inadequate funding in certain areas among sponsored students. Other than these areas of needed improvement, the evidence indicates that the Peanut CRSP program has been very successful in terms of manpower development goals. There is also strong evidence that the students' research and training is already being applied in both the home country of foreign nationals and in the United States. More than 70% of the participants reported application of their university CRSP training.

The open-ended questions suggest even stronger support by former and current students. The lack of criticisms and the quantity, length, and intensity of written responses suggest that the respondents are not just satisfied, but grateful for the CRSP program.

REFERENCES

- Dillman, Don A. 1978. *Mail and Telephone Surveys: The Total Design Method*. New York: Wiley.
- Institut Teknologi Mara. 1980. *Student Tracer Study: Institute Teknologi Mara*. Kuala Lumpur, Malaysia: Institut Teknologi Mara.
- Moxley, Robert L., and Karl F. Wien. 1969. "Socioeconomic Inequalities, Social Rigidity, and the Relation to National Development." *The Cornell Journal of Social Relations*, 4 (2): 1-15.
- Psacharopoulos, George. 1983. *Tracer Study Guidelines*. Washington, DC: Education Department, The World Bank.
- Sommers, Gerald G. 1967. "Evaluation of Manpower Development Programs." In Edward B. Jakubanskas and C. Phillip Baumel (eds.), *Human Resource Development*. Ames, Iowa: Iowa State University Press.
- Sullivan, G. 1981. *From School to Work: Report on the School Leaver Tracer Project (Swaziland)*. Oxford, England: Cotswold Press.
- USAID. 1977. *Tracer Study For the Lerotholi Technical Institute, 1975-77 (Lesotho)*. Washington, DC: USAID.
- USAID. 1981. *Report on A Tracer Study Of the Barbados Youth Skills Training Project 1979-81*. Washington, DC: USAID.

APPENDIX

TABLES REPORTING RESPONSES OF PEANUT CRSP SUPPORTED GRADUATE STUDENTS TO TRACER STUDY SURVEY QUESTIONS

TABLE 1. Prior citizenship before coming to the U.S..

<u>Countries</u>	<u>Frequency</u>	<u>Valid Percent</u>
Burkina Faso	2	3.9
USA	19	37.3
Philippines	7	13.7
Korea	1	2.0
Thailand	8	15.7
Argentina	1	2.0
India	1	2.0
Venezuela	1	2.0
Israel	1	2.0
Taiwan	1	2.0
Brazil	1	2.0
Sudan	1	2.0
Germany	1	2.0
Senegal	2	3.9
Indonesia	1	2.0
Trinidad	2	3.9
Swaziland	1	2.0
TOTAL	51	100.0

TABLE 2. Whether student came to U.S. on CRSP sponsorship.

<u>Response</u>	<u>Frequency</u>	<u>Valid Percent</u>
No	37	72.5
Yes	14	27.5
TOTAL	51	100.0

TABLE 3. Sex of respondent.

<u>Sex</u>	<u>Frequency</u>	<u>Valid Percent</u>
Female	24	47.1
Male	27	52.9
TOTAL	51	100.0

TABLE 4. Primary specialization in graduate school.

<u>Specialization</u>	<u>Frequency</u>	<u>Valid Percent</u>
Crop Science	7	13.7
Entomology	3	5.9
Food Science	15	29.4
Breeding/Genetics	12	23.5
Microbiology	6	11.8
Toxicology	4	7.8
Biotechnology	2	3.9
Plant Pathology	2	3.9
TOTAL	51	100.0

TABLE 5. At which university student received CRSP aid.

<u>University</u>	<u>Frequency</u>	<u>Valid Percent</u>
Univ. of Georgia	18	35.3
Texas A&M U.	8	15.7
N.C. State U.	22	43.1
Alabama A&M U.	3	5.9
TOTAL	51	100.0

TABLE 6. Current employment status.

<u>Status</u>	<u>Frequency</u>	<u>Valid Percent</u>
Student	15	29.4
Government employee	9	17.6
University employee	15	29.4
Private employee	8	15.7
Unemployed	2	3.9
Other	2	3.9
TOTAL	51	100.0

TABLE 7. Degree received during CRSP training.

<u>Degree</u>	<u>Frequency</u>	<u>Valid Percent</u>
M.S.	17	47.2
Ph.D.	19	52.8
	15	not applicable
TOTAL	51	100.0

TABLE 8. Allocation of Professional Time: Average Percent of Time Spent in Seven (7) Selected Categories

<u>Category of Activity</u>	<u>Mean Percent</u>
Professional time spent in teaching	13.9
Professional time spent in research	56.2
Professional time spent in extension	5.3
Professional time spent in service activities	10.0
Professional time spent in administration	11.7
Professional time spent in policy activities	2.8
Professional time spent in other activities	3.1

TABLE 9. Usefulness of university education to present employment.

<u>Usefulness</u>	<u>Frequency</u>	<u>Valid Percent</u>
Useless	0	0
Not very useful	1	2.8
Fairly useful	6	16.7
Very useful	29	80.6
Missing	15	not applicable
TOTAL	51	100.0

TABLE 10. CRSP impact on present position: income.

<u>Response</u>	<u>Frequency</u>	<u>Valid Percent</u>
No	19	55.9
Yes	15	44.1
N/A	17	not applicable
TOTAL	51	100.0

TABLE 11. CRSP impact on present position: promotion.

<u>Response</u>	<u>Frequency</u>	<u>Valid Percent</u>
No	15	44.1
Yes	19	55.9
N/A	17	not applicable
TOTAL	51	100.0

TABLE 12. CRSP impact on present position: productivity.

<u>Response</u>	<u>Frequency</u>	<u>Valid Percent</u>
No	15	44.1
Yes	19	55.9
N/A	17	not applicable
TOTAL	51	100.0

TABLE 13. CRSP impact on present position: co-worker productivity.

<u>Response</u>	<u>Frequency</u>	<u>Valid Percent</u>
No	24	70.6
Yes	10	29.4
N/A	17	not applicable
TOTAL	51	100.0

TABLE 14. CRSP impact on present position: other.

<u>Response</u>	<u>Frequency</u>	<u>Valid Percent</u>
No	26	78.8
Yes	7	21.2
N/A	17	not applicable
TOTAL	51	100.0

TABLE 15. Application of thesis/dissertation in home country.

<u>Explanation</u>	<u>Frequency</u>	<u>Valid Percent</u>
Not given	6	18.2
Given	27	81.8
N/A	18	not applicable
TOTAL	51	100.0

TABLE 16. Examples of thesis applied to home country.

<u>Explanation</u>	<u>Frequency</u>	<u>Valid Percent</u>
Not given	10	31.3
Given	22	68.8
	19	missing
TOTAL	51	100.0

TABLE 17. Technology associated with CRSP training modified for local use.

<u>Response</u>	<u>Frequency</u>	<u>Valid Percent</u>
No	20	66.7
Yes	10	33.3
	20	missing
TOTAL	51	100.0

TABLE 18. Example of use of thesis research applied to U.S..

<u>Explanation</u>	<u>Frequency</u>	<u>Valid Percent</u>
Not given	12	27.3
Given	32	72.7
	6	missing
TOTAL	51	100.0

TABLE 19. Potential use of CRSP training for U.S. and home country.

<u>Explanation</u>	<u>Frequency</u>	<u>Valid Percent</u>
Not given	5	10.9
Given	41	89.1
	5	missing
TOTAL	51	100.0

TABLE 20. CRSP training has been shared with others (multiple answers possible. Percent does not equal 100).

<u>Type of Sharing</u>	<u>Frequency</u>	<u>Valid Percent</u>
None	2	4.1
Coworkers	38	77.6
Training programs	6	12.2
Conferences	33	67.3
Publications	39	80.0
Other agencies	8	16.3
Missing	2	missing

TABLE 21. Overall Satisfaction with CRSP training.

<u>Satisfaction</u>	<u>Frequency</u>	<u>Valid Percent</u>
Not at all	0	0
Not very	1	2.1
Fairly much	19	39.6
Very much	28	58.3
Missing	3	missing
TOTAL	51	100.0

TABLE 22. Number (#) of Publications, (Journal articles, book chapters, etc.) worked on during/since training.*

<u>Publications</u>	<u>Frequency</u>	<u>Valid Percent</u>
# Reporting no publications	25	49.0
# Reporting publications	26	51.0
TOTAL	51	100.0

* TOTAL PUBLICATIONS = 94 (Average=1.84)

TABLE 23. Number (#) of Reports/abstracts worked on during/since training.*

<u>Reports/Abstracts</u>	<u>Frequency</u>	<u>Valid Percent</u>
# Reporting no reports/abstracts	15	29.4
# Reporting reports/abstracts	36	70.6
TOTAL	51	100.0

*** TOTAL REPORTS/ABSTRACTS = 119 (Average=2.3)**

TABLE 24. Number (#) of research projects worked on during/since training.*

<u>Research Projects</u>	<u>Frequency</u>	<u>Valid Percent</u>
# Reporting no projects	8	15.7
# Reporting projects	43	84.3
TOTAL	51	100.0

*** TOTAL PROJECTS INDICATED = 168 (Average=3.3)**

About the Peanut CRSP

Peanut (groundnut) is a crop that enhances sustained, profitable, and environmentally safe use of land with great potential for meeting three food security goals:

- a widely adapted legume crop that increases available food,**
- a stable source of cash income for growers, processors, and distributors which increases access to food, and**
- provides a better nutrient balance for the user.**

The Peanut CRSP (Collaborative Research Support Program) is dedicated to enhancing these potentials through addressing global problems in peanut production and use. Major goals are to generate solutions to current problems and to improve research capabilities that enhance the probability of effectively addressing future problems.

The program involves four U.S. universities engaged in collaborative research with institutions in some 12 developing countries that host the Peanut CRSP, six regional and international organizations, and over 65 scientists, all engaged in priority research and development issues in Semi-Arid Tropical West Africa, Southeast Asia, and the Caribbean. Additionally, the collaborative nature of the program allows for feedback that provides solutions to producer, processor, and consumer problems in the U.S. The Peanut CRSP communicates information on technologies as they are developed through workshops, networks, training and publications.

The Peanut CRSP was implemented in 1982. It is supported by a grant from the United States Agency for International Development to The University of Georgia with sub-grants to the participating institutions. There is a strong and successful effort to insure complementarity with ICRISAT in program planning, technology development, and communication of information.

Participating institutions

United States

Alabama A&M University
The University of Georgia
North Carolina State University
Texas A&M University

West Africa

Senegalese Institute for Agricultural Research (ISRA), Senegal
Senegalese Institute of Food Technology (ITA), Senegal
Institut Superior Polytechnique (ISP), University of Ouagadougou,
Burkina Faso
National Institute for Agricultural Research of Niger (INRAN), Niger
Institute of Agricultural Research, Amadou Bello University, Nigeria
Institute of Economic Research (IER), Mali

Southeast Asia

Philippine Council for Agriculture, Forestry and Natural Resources Research
and Development (PCARRD), Los Banos, Philippines
Institute of Plant Breeding, National Crop Protection Center, Institute of
Biotechnology, and the University of the Philippines, Los Banos, Philippines
Thailand Department of Agriculture, Kasetsart University and
Khon Kaen University, Thailand

Caribbean

Caribbean Agricultural Research and Development Institute (CARDI)
Headquarters on the University of the West Indies campus,
St. Augustine, Trinidad

Near East

Agricultural Research Center, Giza, Egypt

International Centers

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India
ICRISAT Sahelian Center (ISC), Niger
International Development Research Centre (IDRC), Canada
Australian Centre for International Agricultural Research (ACAIR), Australia
French Institute for Oilseeds Research (IRHO), France
Conférence des Responsables Africains et Français de la Recherche
Agronomique (CORAF), France

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