

PEANUT UTILIZATION IN FOOD SYSTEMS IN DEVELOPING COUNTRIES

Grant AID/DSAN-G-0247 AAMU/FT/FL/CAR

July, 1982 - April, 1985

Principal Investigator: B. Onuma Okezie, Professor,
Director, Office of International Programs

Co-Investigators: B. Singh, Professor
G. C. Wheelock, Professor
H. Jones, Assistant Professor
V. Caples, Professor,
Associate Dean, Division of Home Economics

Host Countries: Caribbean Countries

Institution: Alabama A & M University
Units: Office of International Programs
Department of Food Science & Animal Industries
Department of Agribusiness Education
Division of Home Economics
Normal, Alabama



BEST AVAILABLE COPY

TABLE OF CONTENTS

1. Progress: An Outline
2. Memorandum of Understanding (MOU) and Plan of Work
3. Trip Reports
4. Annual Report, 1984
5. Survey Instruments
6. Budget

PEANUT UTILIZATION IN FOOD SYSTEMS IN DEVELOPING COUNTRIES

Introduction: Scope of the project - project objectives
Justification of the project in the Caribbean countries

Project Organization:
Alabama A&M University
University of Florida
Caribbean countries
CARDI
Food Technology Institute
University of West Indies
MOU
Plan of Work

Trips:

1. Planning trip (September, 1983)
2. Planning trip (December, 1983)
3. Trip to complete survey (May, 1984)
4. Trip to finalize plan of work (December, 1984)
5. Trip to finalize MOUs (January, 1985)

Benefits: To Caribbean countries
Institutional Development
CARDI
Food Technology Institute
University of West Indies
To AAMU
To University of Florida

Interest of the Institution:
Departmental interest
School of Agriculture

Accomplishments: Lab capabilities at CARDI, FTI, UWI
Survey completed on consumption and post-harvest handling

Current Research Activities:
1. Decontamination of peanuts (University of Florida)
2. Survey data analysis (AAMU)

Trips Planned: May-June, 1985 to initiate research in Jamaica and Trinidad
Drs. George Sammy and Townsend visit to IFT meeting in
Atlanta

Cooperators: Scientists have expressed willingness to cooperate

Administrative Support: Very good at AAMU

Problems: Delays in the MOUs.

TITLE: PEANUT UTILIZATION IN FOOD SYSTEMS IN DEVELOPING COUNTRIES

HOST COUNTRY: CARIBBEAN COUNTRIES
(Jamaica, Trinidad, St. Vincent, Belize)

Summary (Continued)

the production of beverages alone and in combination with coconut or water buffalo milks. Nutritional quality of the peanuts and the fortified foods will be determined by such techniques as biological value, net protein utilization and protein efficiency ratios. These techniques will be assessed by animal feeding studies. Other nutrients will be determined. The impact of peanut fortification of the endogenous foods on nutrient uptake will be evaluated. Selected indices of general health and well-being in the populations consuming the fortified food systems will be monitored.

Training of LDC's personnel will be at the graduate and post-graduate levels and "study-visit" activities under contracted time periods will be available at the University of Florida. Training will be conducted in all research aspects of this grant proposal.

Brief description of personnel and activities they will perform in the LDC's
Dr. E. M. Ahmed: Food quality assessment, peanut fortification of endogenous foods, sensory and instrumental methodology

Dr. R. H. Schmidt: Microbiological examination, peanut beverages formulation, fermentation

Dr. J. F. Gregory: Aflatoxin determination, decontamination of infected products

Dr. H. S. Sitren: Nutritional quality evaluations, animal feeding studies, nutrients assessment

Dr. Lynn B. Bailey: Impact of food fortification on nutrient uptake by humans, role of vitamins in human health

Dr. James S. Dinning: International authority on human nutrition. Recently completed a several-year assignment in Thailand in the areas of human nutrition and medicine.

Additional ongoing activities of the principal investigator(s) and/or institution that may be of interest to collaborating LDC scientists or institutions.

Food Science and Human Nutrition Department has additional expertise in: pesticide residue analysis, agricultural biochemistry, fate of vitamins in processed foods, processing of fruits and vegetables, processing of seafoods, food chemistry, food microbiology, industrial food fermentation, food engineering, carbohydrate chemistry, post-harvest physiology of fruits and vegetables, nutritional biochemistry and food composition.

OBJECTIVES

The overall objectives are:

- A. Description and understanding of variations in environment, socioeconomics, and food technologies as they constrain the preservation and utilization of peanut supplies. Analysis of the current and potential dietary role of existing peanut products.
- B. Assessment of the sensory, nutritional, microbiological and toxicological quality parameters of the peanut products.
- C. Incorporation of indigenous peanut and peanut products into solid and/or beverage food systems locally consumed.
- D. Preparation and presentation of peanut fortified foods in order to determine acceptance and nutritional value of such products.
- E. Insurance of safety of the products with particular reference to mycotoxins in raw and finished products.

APPROACH

- .Consumption Survey - Similar approach as in the Sudan;
 - .Post-Harvest Survey - Similar approach as in the Sudan.
-

ACCOMPLISHMENTS

.Surveys have been completed in Trinidad, Jamaica, St. Vincent.

E. PROJECT DESCRIPTION

1. Location of Proposed Research

a. Philippines:

Philippine Council for Agriculture and Resources Research
Dr. Ponciano A. Batugal, Director of the International Projects
Division

University of the Philippines at Los Banos
Dr. Elias E. Escueta, Food Scientist

- #### b. Thailand:
- Department of Agriculture, Division of Agronomy,
Bangkok
Dr. Sanid Landthong, Faculty of Agriculture,
Khon Kaen University
Mr. Kasem Chompoonutprapa, Northeast Agricultural
Center, Kohn-Kaen, Thailand
Dr. Srinives Peerasuk, Kasetsant University,
Bangkok

2. Introduction

a. Goals:

1. Development of acceptable food products of high nutritional value containing peanuts or peanut products.
2. Determine the impact of these new peanut-fortified food products on the nutritional intake and status of the populations of Thailand and the Philippines.

b. Objectives:

1. Assess the sensory, nutritional, microbiological and toxicological quality parameters of peanuts and peanut press cake produced in developing countries.
2. Incorporation of indigenous peanuts into solid and/or beverage food systems locally consumed in Thailand and the Philippines.
3. Prepare and present peanut fortified foods to populations in the Philippines and Thailand. Determine their acceptance of these products and assess their nutritional value by calculating the contribution of peanut nutrients to the total nutrient intake. Monitor selected indices of general health and well-being in the populations consuming these products.

c. Previous Work

Diets consumed by a large segment of the populations in developing countries consist predominately of cereals and tubers and include negligible amounts of protein-rich foods (7,60). Protein malnutrition is of epidemic magnitude of the consuming population of the developing countries. Consequences of dietary deficiencies in proteins, minerals and vitamins are strikingly seen in such vulnerable groups as infants, toddlers, young children and expectant and nursing mothers (79). There is great need for the large scale production of low cost, highly nutritious, and acceptable processed food products based on raw foods already existing in the developing countries. Such food products, where necessary, could be fortified with minerals and vitamins (39,79). Peanuts could be used as the source of protein enrichment of the existing consumed foods.

The World Health Organization (WHO) Protein Advisory Group suggested the following considerations (35) in supplementing human diets with protein-rich ingredients:

- 1) amino acid content of each ingredient and of the processed food
- 2) possibility of the presence of toxic factors
- 3) necessity of avoiding processes that may damage protein quality
- 4) desirability of using products of local origin
- 5) acceptability of the product to the consuming population
- 6) suitability of the product for feeding weaned infants
- 7) low cost and good keeping quality of the food product

Calorie malnutrition is another deficiency that characterizes some diets of the developing countries. Peanuts are a good source of calories and protein (585 cal/100 g full fat peanut kernels, about 50% oil and about 25% protein). Approximately 19 million metric tons of peanuts are harvested annually, contributing over 7.0 million tons of oil and 3.5 million tons of protein (48). The peanut is the world's 4th most important source of edible vegetable oil and the 3rd most important source of vegetable protein. The concentrated efforts to increase peanut yields in developing countries will result in the availability of more edible oil and more vegetable protein.

The primary emphasis on the use of the world's peanuts is for oil production. Peanut meal (residue from oil extraction) contains an average of 50% protein. Unfortunately, the meal is unfit for human consumption because of poor handling and processing and is used instead for animal feed and fertilizer (39). Better methods for oil extraction under sanitary conditions should be developed for those countries so the protein-rich residue will be edible for human consumption (42). In most of the principal peanut producing countries, protein malnutrition is a common phenomenon. This is unfortunate because peanuts are a rich source of protein. The edible

forms range from raw peanuts to oil-free protein-rich peanut fractions prepared under sanitary conditions. Peanut meal or flour could be used to enrich other foods commonly consumed in developing countries. The success of such fortified products depends on attributes such as: high nutritive value; conformity with local acceptability standards, sensory properties similar to traditionally accepted products; a long shelf life, preferably with no refrigeration requirement; ease of handling and storage, and no requirements for additional preparation (24).

Peanut meal or flour could be used to enrich several types of food products available in the developing countries. Examples of such food systems are: bakery products, grain products, cereal flours, cassava-based products, potato-based products, snack-type products, dessert products, confectionary products, dairy products for weanling infants and other food systems (25,43,83,87).

Large amounts of bread and baked goods continue to achieve growing acceptance even in rice eating countries. These are considered convenience foods in situations where there is little time available to cook rice. New food additives in flour mixtures permit the formulation of bread and baked products with ingredients other than wheat flour, such as peanut flour or soy flour. Fortified bread and baked products could be an exceedingly important vehicle for improving nutrition in developing countries. Peanut flour-fortified atta, bread, biscuits, buns, cornbread, cornmeal pancakes, puris, rolls and tortillas were developed and accepted in Africa, central and South America, India, Australia and New Zealand (82,87). Supplementation of cornmeal muffins with peanut flour allowed weanling mice to sustain a maximal growth rate on a smaller dietary intake (1). This study also demonstrated that consumption of two fortified muffins would provide 30 and 36% of the RDA protein requirements for the adult male and female, respectively.

Cereal and grain products such as noodles, macaroni, cornmeal porridge and rice fortified with peanut flour were developed and utilized in Africa, Colombia and Brazil, South America and the U.S.A. Main dishes containing beans and rice were fortified with peanut flour (82).

Cookies fortified with peanut flour were developed to enhance their nutritional values by augmenting the protein content (82). Ahmed and Heisler (2) fortified several types of cookies with defatted peanut flour. The fortified cookies contained about twice as much protein as the non-fortified cookies. These authors reported that difference and preference sensory testing showed similar ratings for the fortified and non-fortified cookies.

The prevailing national food consumption pattern in the Philippines is two parts plant protein to one part animal protein.

This principle was used to develop a successful school meal, "the Nutribun," for children ranging in age from 7-13 years. A mixture of wheat flour, non-fat milk solids, sugar, vegetable oil, salt and yeast was used to manufacture the bun (25). Nutritional daily requirements for a 12-year old Filipino is 45 g protein and 2000 calories. The "Nutribun" provided 17 g protein and 500 calories, in addition to about 30-56% of the daily requirements of some vitamins and minerals. Partial replacement of wheat flour with peanut flour will result in higher protein content in the bun or it can reduce the amount of nonfat milk solids required for the blend. The "Nutribun" could be extended to provide Filipino pre-school children with this energy-packed, wholesome, and nutritious product.

There is a widespread interest in the developing world for the availability of low cost weaning foods based on vegetable protein. This is due primarily to the shortage of milk or milk protein in these countries. The Korean Institute of Science and Technology is interested in the development of a weaning food based on indigenous food ingredients. Ahmed, Yoo and Bates (3) developed a weaning food from a mixture of soybean and rice that is rich in protein. A 220 g serving of this food supplies the recommended dietary allowance (RDA) of protein for an infant weighing 10 kg. Other weaning foods are "cerealinea", used in Brazil, a mixture of full fat soy flour, milk powder, corn starch and vitamins and minerals; "Incaparina", a mixture of cottonseed and corn flours and vitamins and minerals; "Supramine", a mixture of wheat-chick pea-lentil flours, nonfat milk solids, and vitamins and minerals; "Australian milk biscuit", a mixture of wheat and soy flours, butter fat, sugar and vitamins and minerals; and "Duryea", a mixture of high lysine corn and soy flours, milk powder and vitamins and minerals. All these weaning foods were accepted by the children of the developing countries, possess protein contents ranging from 20 to 28%, and protein efficiency ratios ranging from 2.3 to 2.4 (24). Peanut flour could be used in the manufacture of weaning foods for the developing countries.

The feasibility of using nutritious milk substitutes made from peanut or soybean to supplement the diets of infants and children have been demonstrated. A 500 g portion of peanut kernels yields about 3.5 kg of milk substitute and is palatable to children (39). Beverages are quite acceptable food products in developing countries. Milky beverages made from soybeans are widely accepted food products in Singapore, Hong Kong, Thailand, Colombia and Brazil. To help alleviate the insufficient production of milk in the developing countries, peanuts, peanut flour, or the press cake from oil extraction could be used to formulate peanut milk beverages and related products.

Beverage formulations based on peanuts and/or peanut protein products have been investigated in some detail (11,13,17, 33,71,73,74). The most notable large scale production application of peanut beverage products to LDC's has been at the Central

Technological Research Institute in Mysore, India (17) where Miltone, a peanut flour toned buffalo milk, has been produced. A peanut flour/cheese whey blend has also been developed by the U.S. Department of Agriculture (USDA) for child feeding programs by the U.S. Agency for International Development (AID) (33).

Undesirable flavor and texture have resulted in limited acceptance of beverages formulated from full-fat or partially defatted peanut or soybeans (11,54,55,56,71,74,86). Flavor problems associated with lipid oxidation reactions in soybean milk have been extensively investigated (54,55,56,86). Processing techniques have been developed which are primarily directed at heat-inactivation of lipoxxygenase. The off-flavors associated with peanut milk beverages have not been adequately characterized nor has sufficient research been conducted in development of adequate processing techniques for off-flavor removal.

Lactic acid fermentation has been used to improve flavor, texture and storage stability of oilseed beverages (6,11,13,37,38,54,84). An enzymatic mechanism involving alcohol dehydrogenase has been suggested for the lactic acid bacterial involvement in flavor of these products (72). Hydrolysis of soy protein with protease enzyme has been used to improve acceptance of soy beverages (80).

Beverage and related products prepared from peanut protein/cow's milk blends are generally more acceptable than are those prepared from peanut alone (71,73). Blending with milk also has a nutritional advantage to the formulation of a beverage from peanuts alone. A third advantage of formulation of milk-peanut blends over peanut milk beverages is that they provide a more standard substrate for lactic acid fermentation. The feasibility of blending with milk would depend on the indigenous milk supply, the cultural acceptance and dependence of milk and the degree of lactose intolerance in the population (69).

"Coconut milk," a product produced by aqueous extraction of ground coconut, is consumed to some extent in the Philippines and other LDC's and has been suggested for child feeding programs in LDC's (64). Economical oil extraction techniques and preparation of coconut skim milk have been discussed (31). Depending on coconut availability, it is conceivable that peanut protein fortified coconut milk or the formulation of coconut/peanut milk blends may improve cultural acceptability of peanuts in beverage applications.

The preparation of non-ripened or ripened peanut gel matrix products simulating cheese or soybean-tofu could find application in LDC's as a means of improving shelf life and palatability. Gel formation mechanisms with calcium and heat (66,67) or by acidification (32) have been extensively investigated in soybean-tofu and related systems. Gel structure formation with peanut protein products has only been partially investigated (70).

Peanut cheese-like products ripened through microbial inoculation (40,65) and non ripened peanut cheese analogs have been discussed (41). Replacement of caseinate and oil with peanut protein and peanut oil, respectively, for the production of cheese analogs in the U.S. market has been investigated (20). Acceptable products resulted with replacement of caseinate with peanut protein cheese analogs and at 85% for soft cheese analogs.

Along with the food science topics discussed above, it is pertinent to consider the potential role of peanuts on the nutritional intake of Thais and Filipinos. Initially, attention should be focused on the presence and significance of certain antinutritional factors known to be present in peanuts, and development of appropriate methods to overcome them. Studies can then be carried out to assess the effects of increased peanut consumption on the overall nutritional intake of different age groups.

The peanut can make a potentially excellent contribution to the nutrient intake of the people in Thailand and the Philippines. The protein content is approximately 25%, a relatively high value when compared to those plant proteins commonly consumed in these countries. For example, rice is about 7.5% protein while cassava is less than 2% protein (61). The peanut also represents a concentrated source of energy. The fat content is approximately 50% and total energy is 585 kcalories per 100 g. In addition, the peanut is a good source of potassium, phosphorus and magnesium as well as vitamin E and thiamine.

The amino acid composition of the peanut varies depending upon several factors. These are the type of peanut, cultivar, location grown, year, and maturation of kernels (4). In terms of protein quality, the peanut, in combination with certain other sources of protein, can yield a product of high biological value (9). Peanuts are inherently low in the sulfur containing amino acids as well as lysine and threonine. However, there are two-fold variations in the concentrations of these amino acids depending upon the factors mentioned above (4), and this is reflected by a 50% difference in biological values between certain peanut types (51,52).

Overall, peanuts are a good source of both energy and protein, the two nutrients most likely to be limiting in populations of Thailand and the Philippines. There are, however, certain potential drawbacks to the use of peanuts as a significant food source. Concern here will focus only on nutrition related problems.

The peanut, like other legumes, contains agents which limit its food value unless certain processing techniques are employed to counteract them. In this respect, much more information is known about the soybean than the peanut. The protease inhibitor, trypsin inhibitor (TI), is believed to be a common constituent

Summary of Proposal
for the
Peanut Collaborative Research Support Program

Principal Investigator and Department Dr. E. M. Ahmed, Food Science & Human Nutrition
Institution and Location Institute of Food & Agricultural Sciences, Univ. of Florida,
Gainesville
Co-Principal Investigator and Department Dr. Harry S. Sitren, Food Sci. & Human Nutr.
Institution and Location Institute of Food & Agricultural Sciences, Univ. of Florida,
Gainesville
Co-Principal Investigator and Department Dr. Ronald H. Schmidt, Food Sci. & Human Nutr.
Institution and Location Institute of Food & Agricultural Sciences, Univ. of Florida,
Gainesville
Co-Principal Investigator and Department Dr. Jesse F. Gregory III, Food Sci. & Human Nutr.
Institute of Food & Agricultural Sciences,
Univ. of Florida, Gainesville
Consultant at no cost to CRSP: 1. Dr. Lynn B. Bailey, Food Science & Human Nutr. Dept.,
IFAS, Univ. of Florida, Gainesville
2. Dr. James S. Dinning, Food Science & Human Nutr. Dept.,
IFAS, Univ. of Florida, Gainesville

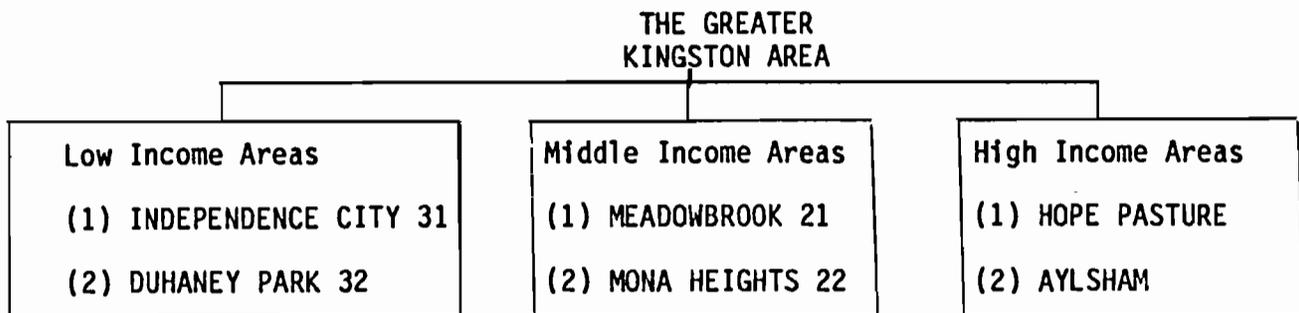
Consuming populations in the developing countries suffer from protein and calorie malnutrition. The overall goals of the CRSP grant proposal are the utilization of endogenous peanuts produced in developing countries to develop acceptable food systems of high nutritional values and determination of the impact of the fortified food products on the nutritional intake of the developing countries populations. The potential importance of this proposal is the utilization of endogenous peanuts in the production of wholesome nutritious human foods which will result in the improvement of nutrients uptake and nutritional status of the consuming population of the developing countries. Additional benefit of peanut utilization for human food will be additional income to the small farmers that produce peanuts.

Experimental research plans will include assessment of the presence of aflatoxin contamination, antinutritional factors such as trypsin inhibitor and hemagglutinins and best methods for rendering the endogenous peanuts wholesome and safe to consume. Available lysine and methionine will be determined. Assessment of the sensory quality of peanut, endogenous foods presently consumed and mixtures of peanut: endogenous food systems by sensory methodology and instrumental measurements. Peanuts will be used in

OBSERVATIONS:

.Need for post-harvest and storage research;

.Need for research on quality evaluations for processing.



ENUMERATORS

- | | |
|--------------------|----------------------|
| (1) Andrea Reid | (5) Garnet Peterkin |
| (2) Peter Smith | (6) Michael Richards |
| (3) Wayne Bowden | (7) Adrian Rose |
| (4) Carlton Wallen | |

Figure 1. Scheme of Survey on Consumption of Peanuts in Jamaica (urban site).

PEANUT UTILIZATION IN FOOD SYSTEMS
IN DEVELOPING COUNTRIES

ALABAMA A&M UNIVERSITY (SUBGRANTEE UNIVERSITY OF FLORIDA)
CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

DR. B. ONUMA OKEZIE, PRINCIPAL INVESTIGATOR

INTRODUCTION

This project is designed to address constraints of utilization of peanuts in the Caribbean region through improving existing peanut products or producing new products acceptable to local populations. The first phase of the study includes a consumption survey to determine the current role of peanuts in the diet and post harvest survey to determine current practices, including storage techniques and inventory management practices and constraints that may impact on supply and consumption of peanuts.

MAJOR ACCOMPLISHMENTS

Establishment of Project

The project in the host countries is coordinated by the Caribbean Agricultural Research and Development Institute (CARDI), Trinidad. The CARDI will be collaborating through its offices in the participating CARICOM Country. The University of the West Indies will be participating under a separate Work Plan, but within the same MOU umbrella.

Research Results

The major accomplishment of the project has been the completion of surveys in Trinidad, Jamaica, and St. Vincent, the principal consuming and/or producing countries in the region. The surveys which were conducted by Alabama A&M University in collaboration with host country scientists were carried out in St. Augustine, Trinidad (urban population-consumption); in

Kingstown, St. Vincent, (urban area-consumption) and (rural area-post harvest and consumption surveys) and in Kingston, Jamaica (urban area - consumption); and St. Elizabeth Parish near Santa Cruz, Jamaica, (rural producing areas - consumption and post harvest surveys).

The data from the survey are currently being analyzed. As soon as the analysis is completed, Alabama A&M University scientists along with food scientists from the University of Florida and CARDI scientists will develop plan and sites for future research based on the results of the survey.

EXPECTED IMPACT OF PROJECT

Improved dietary status of the populations in the Caribbean Region by a greater utilization of peanut as a major food source. An increased utilization would expand the market potential for farmers of the region.

The impact of the project in the U.S. could be that the products and processes developed could have domestic application.

GOAL

The major goal of this research project is to develop the means for greater utilization of peanuts as a food through determining the role of peanut as food items in diets, or as an ingredient in a food system; improvement of existing peanut food products, and development of new peanut food products.

OBJECTIVES

The overall objectives are:

- A. Description and understanding of variations in environment, socioeconomics, and food technologies as they constrain the preservation and utilization of peanut supplies. Analysis of the current and potential dietary role of existing peanut products.
- B. Assessment of the sensory, nutritional, microbiological and toxicological quality parameters of the peanut products.

- C. Incorporation of indigenous peanut and peanut products into solid and/or beverage food systems locally consumed.
- D. Preparation and presentation of peanut fortified foods in order to determine acceptance and nutritional value of such products.
- E. Insurance of safety of the products with particular reference to mycotoxins in raw and finished products.

ORGANIZATION

Alabama A&M University

Dr. B. Onuma Okezie, Project Administrator, Office of International Programs, Normal;

Dr. Bharat Singh, (Food Scientist), Cooperator, Department of Food Science, Normal

Dr. Gerald Wheelock, (Rural Sociologist), Cooperator, Department of Agribusiness, Normal

Dr. Hezekiah S. Jones, (Rural Economist), Cooperator, Department of Agribusiness, Normal

Dr. Virginia Caples, (Home Economist), Cooperator, Division of Home Economics, Normal

University of Florida

Dr. E. M. Ahmed, Co-Principal Investigator, Department of Food Science, Gainesville, (Food Scientist)

Dr. H. S. Sitren, Cooperator, Gainesville

Dr. R. Schmidt, Cooperator, Gainesville

Dr. J. F. Gregory, Cooperator, Gainesville

CARDI

Dr. S. Parasram, Director of Research

Dr. St. Clair Forde, Administrative Liaison

Dr. Don Walmsley, Agronomist, CARDI, St. Augustine, Trinidad

Mr. Horace Payne, Peanut Agronomist, CARDI, Kingston, Jamaica

Mr. Joseph R. R. Suah, Head of the Unit, CARDI, Jamaica

University of the West Indies

Dr. George Sammy, Food Scientist

Approach

The original plan of work developed by Alabama A&M University, University of Florida, and the Management Entity was based on the objectives outlined in the original work proposal. Some modifications were made after two visits to CARDI and consultations with official representatives of the Institute. The existing plan of work incorporated the suggested changes. It provides among other things that Alabama A&M takes responsibility for the peanut consumption and post harvest survey in cooperation with host country counterparts (objective A) and the examination of safety of raw peanuts and existing peanut products with particular reference to mycotoxin contamination (objective E modified).

It also provides that the University of Florida, the subgrantee, takes responsibility for accomplishing the product development part of the project, as outlined in objectives B, C, and D. All these objectives are to be pursued in collaboration with appropriate CARDI scientists from Trinidad, Jamaica, St. Vincent, and Belize, and food scientists from the University of the West Indies, St. Augustine, Trinidad. It is anticipated that scientists from the Food Technology Institute in Jamaica and the Food and Nutrition Institute in Trinidad will be brought in when and if needed.

In the light of recent information obtained during the survey and the expected results of the survey, additional modifications in the work plan are anticipated. This final work plan will be developed after the results of the consumption and post harvest surveys are known and a planned meeting of all the collaborators from the major peanut consuming and producing countries in the region has been held.

ACCOMPLISHMENTS

1. Visits to CARDI in 1983 by the Management Entity, and jointly by Alabama A&M and the University of Florida resulted in the development of MOU and the original plan of work.

2. Alabama A&M University scientists developed the peanut consumption and post harvest survey instrument, field tested it in cooperation with CARDI scientists in December, 1983. Modifications of the survey instrument resulting from field test results were incorporated and final instrument produced. Two survey documents, consumption and post harvest instruments, were developed. The consumption survey instrument was designed to collect data on amounts and types of peanut foods consumed daily, weekly, monthly, and seasonally; intrafamily consumption patterns; cost and preferences; sources of peanuts for family; amount of peanut oil consumed, and home food preparation activities and methods. The post harvest survey instrument included questions to determine post harvest practices including harvesting, management of products after harvesting, storage practices, and final disposal of the peanut (sale or home consumption).
3. Alabama A&M University scientists in collaboration with CARDI scientists conducted the peanut consumption and post harvest surveys. The information therefrom is currently being analyzed. The surveys were conducted at the following locations:
 - St. Augustine, Trinidad (urban) - consumption;
 - Kingstown, St. Vincent (urban) - consumption
(rural) - consumption and post harvest;
 - Kingston, Jamaica (urban) - consumption
 - St. Elizabeth, Jamaica (rural) - consumption and post harvest.

The survey in urban areas in each country was done with populations stratified into low, middle, and high income sectors. It was not possible to stratify the rural population in the same manner. However, enough areas were covered to include variations in income, soil type, farming practices, rainfall, and other important variables or constraints.

GENERAL PLAN FOR 1984

1. Analysis of survey data;
2. Analysis of peanut samples collected from survey areas for proximate composition and for aflatoxin.
3. Development of plan of research on post harvest practices in Jamaica and St. Vincent.
4. Development of plan and initiation of research on peanut product modification and/or development.
5. Exploration of the establishment of a capability in the region for product analysis and quality assurance.
6. Initiation of training of host country personnel in food science and technology.

It is expected that activities related to 3, 4, 5, and 6 above will continue in 1985, 1986, and 1987.

MEMORANDUM OF UNDERSTANDING

Between
The University of Georgia as
The Peanut Collaborative Research Program Management Entity,
The University of Georgia,
Alabama A & M University,
and
Caribbean Agricultural Research and Development Institute,
University Campus,
St. Augustine, Trinidad
With Regard to the Establishment of a Collaborative
Research Relationship

I. The Peanut Collaborative Research Support Program (Peanut CRSP)

The Peanut CRSP operates by approval of the U. S. Government under the provision of Grant No. DAN-4048-G-SS-2065-00, to the University of Georgia, designated as the Peanut CRSP Management Entity. The Peanut CRSP is under direction of the Management Entity with the guidance of the Board of Directors, Technical Committee, and the External Evaluation Panel.

The Peanut CRSP is an integrated and coordinated program of individual research projects each on specific aspects of peanut production and utilization. These research projects are to be carried out by scientists from U. S. institutions and scientists from Host Country institutions working together in close collaboration. The participating scientists are equal collaborators and the rights for publication of findings carried out under the Peanut CRSP should be so viewed. All publications must acknowledge support from A.I.D. and include the grant number. All publications should be attributed to the authors, stating that opinions expressed or recommendations made do not represent an official position or policy of A.I.D.

A. Goal

The goal of the CRSP is to assist identified countries to address problems of famine and malnutrition through collaborative research on peanut production and utilization as related to farmer and consumer needs. This goal is in support of the U. S. Government commitment to Famine Prevention and Freedom from Hunger under the Foreign Assistance Act.

B. Procedure for Establishment of the Collaborative Research Relationship.

With mutual understanding of the CRSP and its goal as described above, a collaborative research relationship is developed as follows:

1. Based on previous discussions and consultations on constraints to peanut production and utilization and research needs to relieve these constraints; projects were prepared, reviewed, and appropriate projects selected through established procedures. The U. S. Principal Investigator visited CARDI-Trinidad and discussed the project with potential collaborators and made necessary revisions of project objectives and procedures. Based on this tentative approval of the project by Peanut CRSP and U. S. and Caribbean Agricultural Research and Development Institute representatives this collaborative agreement has been reached.

2. The collaborative research agreement will include:

(a) this Memorandum of Understanding between the Peanut CRSP Management Entity and CARDI, (b) a Plan of Work to implement the research proposal(s) between the participating U. S. and CARDI institutions with the research project attached detailing research to be done.

3. Any number of Plan(s) of Work following these same procedures may be developed as appropriate under this Memorandum of Understanding.

4. After receipt and acceptance of these documents by the CRSP Management Entity, funds can be released to implement the research.

II. Administration of Collaborative Research Projects.

A. The Peanut CRSP is funded by A.I.D. and the Participating U. S. Institution and administered by the Management Entity, the University of Georgia. The Management Entity is responsible to A.I.D. for all fiscal matters and research progress. Each participating U. S. institution in turn is responsible to the Management Entity for fiscal matters and research progress under their project(s). The collaborating CARDI institution is in turn responsible to the participating U. S. institution for project expenditures and research progress.

1. All project expenditures will be managed by the U. S. participating institution which is held accountable by the Management Entity for the total project funds. Funds to be expended in CARDI directly on its behalf, can be disbursed through CARDI, an International Bank, or other fiscally auditable entity agreeable to the Peanut CRSP Management Entity, the collaborating U. S. institution, CARDI, and the A.I.D. Mission.

2. Funds to be expended directly on behalf of, but not specifically in CARDI-Trinidad, such as for individuals studying in the U. S. or for purchase of research materials to be sent to CARDI-Trinidad, may most efficiently and most cost effectively be expended by the collaborating U. S. institution with the concurrence of the CARDI collaborator.

3. The Caribbean Agricultural Research and Development Institute (CARDI) will be administratively responsible for all funds provided to CARDI for expenditure under the Peanut CRSP, will provide to the participating U. S. institution documentation of expenditures as outlined in the subagreement, and shall submit all records for fiscal audit as requested by the participating U. S. institution. Copies of all audit reports applicable to the Plan(s) of Work will be provided to the participating U. S. Institution. It will be the responsibility of the Peanut CRSP Management Entity to conduct an external audit, if required by A.I.D. CARDI will also be responsible for submitting a research progress report to the U. S. institution and the Management Entity.

4. All project commodities sent to CARDI will be received without customs or duty.

B. Duration of Project.

1. This Memorandum of Understanding or Plan(s) of Work for project(s) covered by this document shall continue until terminated by:

a. Immediate notification of termination of the Peanut CRSP funding grant by A.I.D. Washington;

b. Acceptance by the Board of Directors of a request to terminate by the CARDI institution; or

c. Acceptance by the Board of Directors of a recommendation to terminate by the Peanut CRSP Management Entity.

2. Either the U. S. or CARDI institution may request the Peanut CRSP Management Entity to consider adjustments in their collaborative arrangements.

3. The Peanut CRSP is a continuing project with funds appropriated annually.

IV. Cooperating Personnel

AAMU

Dr. B. Onuma Okezie
Dr. Bharat Singh
Dr. Gerald Wheelock
Dr. Hezekiah S. Jones
Dr. Virginia Caples

Dr. E. M. Ahmed - University of Florida
Dr. H. S. Sitren
Dr. R. Schmidt
Dr. J. F. Gregory

CARDI

Dr. S. Parasram, ~~Executive~~ Director
Dr. D. Walmsley

FTI

Dr. Althea Townsend, Director

V. General Procedures for Accomplishing Research

The U. S. Principal Investigators plan to spend some time each year at CARDI and FTI in research planning, supervision, and research. Selected FTI researchers will make training visits to the U. S. AAMU, University of Florida, and FTI researchers will cooperate in achieving the objectives of the project. Alabama A&M University will subgrant to the University of Florida the product development and evaluation portion of the research.

VI. Research Training

The U. S. Principal Investigators will provide on-site training for FTI scientists and technicians, short term training for selected FTI scientists in the U. S., and provide graduate training for selected FTI students.

Qualified researchers and individuals with baccalaureate degrees may apply for admission to graduate programs at AAMU or University of Florida to conduct thesis research (including classwork) on the proposed research that will lead to MS or PhD. degrees. U. S. Principal Investigators will participate in the selection of trainees. FTI should facilitate in clearance, approval, and to the extent feasible, financial support for students forwarding records and admission requirements for students in advance of arrival.

VII. Budget

A. Pending fund availability each year through the Prime A.I.D. Grant for the Peanut CRSP, the following Year 1 budget is proposed for use by or for CARDI and FTI in conducting this research project. The budget is subject to annual review and possible revision.

Item

Year 1

U. S. dollars

See attachment for Work Plan & Budget

Total

B. CARDI and/or FTI shall submit, at least quarterly but not more frequently than monthly, to Alabama A & M University as agreed upon later, a voucher identifying expenditures of claimed allowable costs by major categories and individual items within major categories. Copies of receipts or vouchers supporting these expenditures shall be attached.

Procedures to reimburse expenditures will be mutually agreed upon by CARDI and/or FTI and AAMU in compliance with Item II. A. of Memorandum of Understanding between AAMU and CARDI to Establish a Collaborative Research Relationship.

The form attached as Appendix I will be used for reporting expenditures; and estimates of CARDI and FTI contributions in terms of personnel, supplies, equipment, and facilities.

VIII. Inventory and Property Management

Title to all equipment, material, and supplies purchased by or for CARDI and/or FTI under this Plan of Work will be in the name of CARDI and/or FTI. All such property shall be under the custody and control of the Participating U.S. Institution. When requested, the collaborating institution shall submit an inventory schedule covering all items of equipment which have not been consumed in performance of the research. Advice will be given by the Participating U. S. institution as to the disposition of property at the end of the Plan of Work.

IX Duration

This project should run concurrent to the Prime Grant, subject to termination in accordance with Section II.B. of the Memorandum of Understanding. This Plan of Work may be reviewed and/or revised annually, as mutually agreed upon by AAMU, CARDI, and FTI Principal Investigators, and the Management Entity (to include the Technical Committee and Board of Directors).

X. Approvals

Having read this Memorandum of Understanding, the persons below have signed their names and shown their agency affiliation indicating their concurrence with the collaborative research relationships outlined therein. All parties involved agree to use their best efforts to perform the duties required to attain the objectives of this research project, and to resolve any problems that may arise as the work progresses. This Plan of Work becomes effective upon execution of this document, a copy of which will be filed with the A.I.D. Mission.

U. S. PARTICIPATING INSTITUTION

HOST COUNTRY INSTITUTION

B. Onuma Okezie *1/11/85*

B. Onuma Okezie Date
Director International Programs
Alabama A&M University.

Al Hall
Scientific Research Council Date *1/11/85*
Jamaica

Aloufer Corington
- Date

President, Alabama A&M University

Shawmy
Executive Director Date *Jan 11, 1985*
CARAI

PLAN OF WORK - HOST COUNTRY
UNDER
MEMORANDUM OF UNDERSTANDING

Between

Alabama A & M University (AAMU)
and

Caribbean Agricultural Research and Development Institute,
University Campus,
St. Augustine, Trinidad
to Conduct a
Research Project under the
Peanut Collaborative Research Support Program

I. Purpose

This Plan of Work implements the research project, "Peanut Utilization in Food Systems in Developing Countries (AAI-FL/FT/CAR), (Appendix I) under the Memorandum of Understanding establishing a Collaborative Research relationship.

II. Goal.

The major goal of this research project is to develop means for greater utilization of peanuts as a direct food through determining the role of peanuts as food items in diets, improvement of existing peanut food products, and development of new peanut food products.

III. Objectives.

The overall objectives are:

- A. Description and understanding of variations in environment, socioeconomics, and food technologies as they constrain the preservation and utilization of peanut supplies. Analysis of the current and potential dietary role of existing peanut products.
- B. Assess the sensory, nutritional, microbiological and toxicological quality parameters of peanuts and peanut products.
- C. Incorporate indigenous peanuts and peanut products into solid and/or beverage food systems locally consumed.
- D. Prepare and present peanut fortified foods and determine acceptance and value of these products.

IV. Cooperating Personnel

AAMU

Dr. B. Onuma Oker'e
Dr. Bharat Singh
Dr. Gerald Wheelock
Dr. Hezekiah S. Jones
Dr. Virginia Caples

Dr. E. M. Ahmed - University of Florida
Dr. H. S. Sitren - " "
Dr. R. Schmidt - " "
Dr. J. F. Gregory - " "

CARDI

Dr. St. Clair Forde, Administrative Liaison
Dr. D. Walmsley

V. General Procedures for Accomplishing Research

The U. S. Principal Investigators plan to spend such time as is necessary each year at CARDI in research planning, supervision, and research. Selected CARDI researchers will make training visits to the U. S. AAMU, University of Florida, and CARDI researchers will cooperate in achieving the objectives of the project. Alabama A&M University will subgrant to the University of Florida the product development and evaluation portion of the research. Alabama A&M will be responsible for the food consumption survey.

VI. Research Training

The U. S. Principal Investigators will provide on-site training for CARDI scientists and technicians, short term training for selected CARDI scientists in the U. S., and provide graduate training for selected CARDI students.

Qualified researchers and individuals with baccalaureate degrees may apply for admission to graduate programs at AAMU or University of Florida to conduct thesis research (including classwork) on the proposed research that will lead to MS or PhD. degrees. U. S. Principal Investigators will participate in the selection of trainees. CARDI should facilitate in clearance, approval, and to the extent feasible, financial support for students forwarding records and admission requirements for students in advance of arrival.

VII. Budget

A. Pending fund availability each year through the Prime A.I.D. Grant for the Peanut CRSP, the following Year 1 budget is proposed for use by or for CARDI in conducting this research project. The budget is subject to annual review and possible revision.

<u>Item</u>	<u>Year 1</u>
	U. S. dollars
Total	\$34,597

B. CARDI shall submit, at least quarterly but not more frequently than monthly, to Alabama A & M University or University of Florida as agreed upon later, a voucher identifying expenditures of claimed allowable costs by major categories and individual items within major categories. Copies of receipts or vouchers supporting these expenditures shall be attached.

Procedures to reimburse expenditures will be mutually agreed upon by CARDI and AAMU in compliance with Item II. A. of Memorandum of Understanding between AAMU and CARDI to Establish a Collaborative Research Relationship.

The form attached as Appendix II will be used for reporting expenditures; and estimates of CARDI contributions in terms of personnel, supplies, equipment, and facilities will be reported on the form attached as Appendix III.

VIII. Inventory and Property Management

Title to all equipment, material, and supplies purchased by or for CARDI under this Plan of Work will be in the name of CARDI. All such property shall be under the custody and control of the Participating U.S. Institution. When requested, the collaborating institution shall submit an inventory schedule covering all items of equipment which have not been consumed in performance of the research. Advice will be given by the Participating U. S. institution as to the disposition of property at the end of the Plan of Work.

IX Duration

This project should run concurrent to the Prime Grant, subject to termination in accordance with Section II.B. of the Memorandum of Understanding. This Plan of Work may be reviewed and/or revised annually as mutually agreed upon.

X. Attachments

The research project outline attached as Appendix 1 to this document... further defines goals, objectives, procedures, individual obligations, and expected accomplishments; and serves as the overall guide for the planned research. As the project progresses, necessary changes may be made in the project upon approval of AAMU and CARDI Principal Investigators, and the Management Entity (to include the Technical Committee and Board of Directors).

XI. Approvals

Having read this Memorandum of Understanding, the persons below have signed their names and shown their agency affiliation indicating their concurrence with the collaborative research relationships outlined therein. All parties involved agree to use their best efforts to perform the duties required to attain the objectives of this research project, and to resolve any problems that may arise as the work progresses. This Plan of Work becomes effective upon execution of this document, a copy of which will be filed with the A.I.D. Mission.

U. S. PARTICIPATING INSTITUTION

HOST COUNTRY INSTITUTION

B. Onuma Okezie 12/8/83
Date
Director International Programs
Alabama A&M University.

S. Bugame 15-12-83
Date
Executive Director, CARDI

R. D. Morrison 12/8/83
Date
President, Alabama A&M University

Shawson 15-12-83
Date
Director of Research and Development, CARDI

APPENDIX I

1. Survey

- A. The survey to be a limited one. Thus based on available funds or cost, the scope should be to cover a few of the islands, possibly Trinidad, St. Vincent and Jamaica involving limited randomly selected family units or consumption units.
- B. Survey when conducted should include collection of samples of peanut products for quality determination or assessment.
- C. The survey results will be analysed by AAMU.
- D. The report will be written jointly by the participating organisations.
- E. A budget is to be attached itemizing possible costs for survey. This document should be attached as an appendix to the MOU - Work Plan - Host Country, representing a specific activity of the general objectives.

III. Approvals

Having read this Memorandum of Understanding, the persons below have signed their names and shown their agency affiliation indicating their concurrence with the collaborative research relationships outlined therein. Additional U. S. Institutions may enter into research with CNRA upon joint concurrence with this Memorandum of Understanding and the mutual agreement on a Plan of Work.

U. S. INSTITUTIONS

David L. Anderson 9/17/82
Program Director, Peanut CRSP Date

Robert C. Anderson 10-8-82
R. C. Anderson Date
Vice President for Research
University of Georgia

W. D. Branch 9/16/82 ✓
Principal Investigator, UGA Date

R. D. Morrison
R. D. Morrison Date
President, Alabama A&M University

HOST COUNTRY INSTITUTION

J.A. Bergasse
J.A. BERGASSE Date
Executive Director, (CARDI)

S. Parasram 3/5/83
S. PARASRAM, Date
Director, Research & Development.

S.Q. Haque
S.Q. HAQUE, Date
Principal Investigator.

Date

ACKNOWLEDGEMENT

The U.S.A.I.D. mission has received and reviewed a copy of this Memorandum of Understanding and believe that the intent and content of the document is compatible with and in support of the goals and interests of the Mission. Travel requests will be reviewed and expeditiously cleared and other services may be offered, as feasible, by the Mission.

PLAN OF WORK
Under The Subgrant
Between the
University of Georgia Management Entity
and
Alabama A & M University (AAMU)
to Implement a
Research Project under the
Peanut Collaborative Research Support Program (CRSP)

This agreement is entered into between the University of Georgia referred to hereafter as the "MANAGEMENT ENTITY", and Alabama A & M University referred to hereafter as the "PARTICIPATING INSTITUTION".

I. Purpose

This Plan of Work describes the Peanut CRSP research project "Peanut Utilization in Food Systems in Developing Countries" (AAM-FL/FT/CAR), under the Subgrant between the "MANAGEMENT ENTITY and the PARTICIPATING INSTITUTION.

The research project attached as Appendix I to this document defines in detail goals, objectives, procedures, individual obligations, and expected accomplishments; and serves as the overall guide for the planned research.

II. Goal.

The major goal of this research project is to develop means for greater utilization of peanuts as a direct food through determining the role of peanuts as food items in diets, improvement of existing peanut food products, and development of new peanut food products. Research will be conducted collaboratively between Alabama A & M University and the Caribbean Agricultural Research and Development Institute, St. Augustine, Trinidad.

III. Objectives.

The overall objectives are:

- A. Description and understanding of variations in environment, socioeconomics, and food technologies as they constrain the preservation and utilization of peanut supplies. Analysis of the current and potential dietary role of existing peanut products.
- B. Assess the sensory, nutritional, microbiological and toxicological quality parameters of peanuts and peanut products.
- C. Incorporate indigenous peanuts and peanut products into solid and/or beverage food systems locally consumed.
- D. Prepare and present peanut fortified foods and determine acceptance and value of these products.

IV. Cooperating Personnel

AAMU

Dr. B. Onuma Okezie
Dr. Bharat Singh
Dr. Gerald Wheelock
Dr. Hezekiah S. Jones
Dr. Virginia Caples

University of Florida (see Section V.)

Dr. E.M. Ahmed
Dr. H.S. Sitren
Dr. R. Schmidt
Dr. J.F. Gregory

CARDI

Dr. St. Clair Forde, Administrative Liaison
Dr. George Sammy

V. General Procedures for Accomplishing Research

The U. S. Principal Investigators plan to spend at least two accumulative months each year at CARDI in research planning, supervision, and research. Selected CARDI Principal Investigators will make training visits to the U.S. AAMU, University of Florida, and CARDI Principal Investigators will independently spend time fulfilling the objectives of the project. Alabama A&M University will subgrant to the University of Florida the product development and evaluation portion of the research. Alabama A&M will be responsible for the food consumption survey.

VI. Research Training

The U. S. Principal Investigators will provide on-site training for CARDI scientists and technicians, short term training for selected CARDI scientists in the U. S., and provide graduate training for selected CARDI students. Qualified researchers and individuals with baccalaureate degrees may apply for admission to graduate programs at AAMU or University of Florida to conduct thesis research (including classwork) on the proposed research that will lead to MS or PhD. degrees. U. S. Principal Investigators will participate in the selection of trainees. CARDI should facilitate in clearance, approval, and to the extent feasible, financial support for students forwarding records and admission requirements for students in advance of arrival.

VII. Budget

Funds obligated for this project are \$119,178 for the period from date of final signature to April 30, 1984.

The tentative 5-year budget for this project is presented in Appendix II. This budget will be used as the basis for total annual allocations, and could change due to availability of funds from A.I.D. and deliberations of the Board of Directors and Technical Committee.

Based on consultations between U. S. and CARDI collaborators in February 1982, the following Year 1 plan for fund utilization was developed.

<u>Item</u>	AAMU	CARDI
	<u>Year 1</u> U.S. Dollars	<u>Year 1</u>
TOTAL	\$81,201	\$37,977

A detailed annual budget plan will be submitted to the Management Entity by the Principal Investigator.

III. Duration

This project should run concurrent to the Prime Grant, subject to termination in accordance with Section II of the Subgrant. This Plan of Work may be reviewed and/or revised annually as mutually agreed upon.

IX. Order of Precedence

The Prime A.I.D. Grant document and the Standard Provisions to the University of Georgia as Management Entity, and the Subgrant Agreement to Alabama A & M University as a Participating Institution take precedence over this document in any case of omission, or inconsistency that may occur between this and the above documents.

X. Approvals.

Having read this Plan of Work the persons below have signed their names and shown their agency affiliation indicating their concurrence with the collaborative research relationships outlined therein. All parties involved agree to use their best efforts to perform the duties required to attain the objectives of the research project, and to resolve any problems that may arise as the work progresses.

MANAGEMENT ENTITY

PARTICIPATING INSTITUTION

David G. Cummins 6-28-83
Date
David G. Cummins
Program Director
Peanut CRSP

B. Onuma Okezie 6/15/83
Date
B. Onuma Okezie
Director International Programs
Alabama A&M University

Robert C. Anderson 7-8-83
Date
Robert C. Anderson
Vice President for Research
University of Georgia

R.D. Morrison 6/15/83
Date
R.D. Morrison
President, Alabama A&M University

PLAN OF WORK - HOST COUNTRY
UNDER
MEMORANDUM OF UNDERSTANDING
Between
Alabama A & M University (AAMU)
and
Caribbean Agricultural Research and Development Institute (CARDI)
University Campus
St. Augustine, Trinidad
and
Food Technology Institute (FTI)
Jamaica
to Conduct a
Research Project under the
Peanut Collaborative Research Support Program

I. Purpose

This Plan of Work implements the research project, "Peanut Utilization in Food Systems in Developing Countries (AAM-FL/FT/CAR/FTI), under the Memorandum of Understanding establishing a Collaborative Research relationship.

II. Goal.

The major goal of this research project is to develop means for greater utilization of peanuts as a direct food through determining the role of peanuts as food items in diets, improvement of existing peanut food products, and development of new peanut food products.

III. Objectives.

The overall objectives are:

- A. Assess the sensory, nutritional, microbiological and toxicological quality parameters of peanuts and peanut products.
- B. Incorporate indigenous peanuts and peanut products into solid and/or beverage food systems locally consumed.
- C. Prepare and present peanut fortified foods and determine acceptance and value of these products.

PEANUT CRSP
TRIP REPORT

TRAVELLER: Dr. B. Onuma Okezie

PLACES VISITED: Trinidad/Tobago and Barbados

PERIOD COVERED: September 19 - 26, 1983

PURPOSE OF TRIP: To finalize the general agreement on the Plan of Work (POW)-Host Country for the AAMU/FL/FT peanut CRSP project with CARDI officials and to develop the specific first year's research plan.

EXECUTIVE SUMMARY:

The Memorandum of Understanding covering the Plan of Work-Host Country could not be signed because CARDI wanted to have the specific work plan for year one would be the consumption survey, and since it had earlier been agreed that CARDI was to prepare a draft of the survey instrument which it could not get ready in so short a time during our visit, it became obvious that signing or finalizing the MOU could not be completed during our visit.

The consumption survey instrument is to be prepared by CARDI using as a guide the one prepared by AAMU for our Peanut CRSP work in the Sudan. The draft document should be sent to AAMU for review and approval as soon as possible to be ready for use for the field survey which was agreed

to take place during the Christmas vacation during which UWI students would be available for the survey as enumerators.

CARDI, in addition to providing a draft of the survey instrument, is to include line item cost breakdown of what the survey is likely to cost. Because there is already a definite allocation of funds for year one the scope of the survey would necessarily be governed by the available funds.

Samples of existing peanut products are to be collected from regular sources and evaluated or assessed for quality. This would be carried out mainly at the University of Florida. More of such samples would be obtained during the survey for similar assessments.

Aflatoxin monitoring effort was considered a priority even though this had not been thought of or seen as a major problem in the region; however the potential for its development or occurrence exists. Money is to be given to the CARDI chemist to buy spare parts for recommissioning an old flourimeter in their laboratory for this purpose. Literature on methodology is to be sent to them immediately.

CARDI is to identify those who are specifically going to work on the food technology part of the project, i.e., the Food Scientists and/or nutritionists and/or food chemists/biochemists as a necessary first step. This information does not seem to exist at the time of the visit.

Exit briefing was held with Messrs. Jim Hughes and Don Harrington at the USAID in Barbados. The discussions were very useful as we reported on our visit to CARDI and they provided

us with very useful information about activities in the region.

DETAILED TRIP REPORT

9/19/83 - Left Huntsville at about 6:50 A.M. and arrived at Port of Spain in Trinidad at about 6:45 P.M. Dr. Ahmed from the University of Florida, who had joined me from Miami, and I checked into the hotel at about 8:35 P.M.

9/20/83 - We took a taxi to CARDI office at 6:30 A.M. since we had been warned about the heavy traffic commonly encountered in the town. So we attempted to avoid it. We were lucky on arrival at the premises to find someone to let us into the CARDI building before Dr. Haque got there at 8:30 A.M.

Our meeting with Dr. Haque took the whole morning and the afternoon was spent to find an alternative lodging place since the Holiday Inn seemed inconvenient as they could not provide us with separate rooms, although the reservations for two single rooms were confirmed before we left the U.S. The country was hosting the Commonwealth Finance Ministers Conference which started same day. This event seemed to have caused the failure by the hotel to provide us with adequate accommodations.

In our discussion with Dr. Haque, he provided us with briefings on the structure and present activities of CARDI which indicated coverage of most aspects of their agricultural

crop production. These include the food legumes, cowpeas, pigeon peas, peanut and very small work on soybean; vegetable crops mainly tomatoes, cabbage, carrots, cucumbers, okra, corn, pumpkin, lettuce, etc; root crops such as cassava, sweet potatoes, yams, tannia, arrow root, dasheen; forages for animal feeding and byproducts such as fish meal, and farm waste; animal management and production practices involving mainly sheep, chicken, pig and beef, very few goats are raised. For the fruit crops such as bananas, a separate institute located in St. Lucia was established. It is said that after tourism, banana is the next biggest export crop and foreign exchange earner for most of the region. Coconut, coffee, sugar cane, and cocoa are plantation crops. Rice is mainly grown in Guyana and Trinidad as upland rice.

With regard to peanut production and consumption, about 16 million pounds are consumed annually, mainly as a snack food. Of this, only about 3 million pounds are locally produced, the other 13 million are imported from the U.S.A. and Brazil. For the 4.2 million people in the region, this consumption amounts to about 4 lb. per capita.

Trinidad consumes about 6-7 million lbs. annually, eaten as roasted and/or salted. Most of the peanuts imported or locally produced are sold in the shelled form. Locally produced unshelled peanuts sell for about TT\$2.50/lb. while the processed and bottled peanuts are sold at about TT\$8.00/lb.

Peanuts are planted in May/June and harvested at the end of September. The second cropping period takes place during the first week of October for planting and harvesting during the end of January or beginning of February.

The production consumption pattern is shown in the attached table which shows Jamaica, St. Vincent, St. Kitts/Nevis, Belise and St. Lucia as the main producers while Trinidad/Tobago produces none and consumes most. Production activities in Antigua are new or just beginning. The locally processed peanuts are handled mainly in Trinidad with minor processing activities in the other islands.

Aflatoxin

There is no evidence of an aflatoxin problem in the region. This does not necessarily mean that it does not exist. The fact is that no attempt has been made to test for aflatoxin contamination in the products. We had discussions with Dr. Morris the chemist who described what efforts were being made to start testing for aflatoxin presence in the peanut products in the region. They indicated that some work was being done in CARIRI using HGLC by Dr. Chang Yen in the Chemistry department. Dr. Haque expressed strong desire for aflatoxin monitoring system to be established. He requested that arrangements should be made to survey for aflatoxin contamination as it may exist at the present time. The need was also expressed to provide a flourimeter for the quick monitoring activities. Dr. Haque accepted to provide some money to help the chemist procure

a filter needed for r commissioning an existing test equipment for getting the work started.

9/21/83 We were again picked up at 8:30 A.M. from the airport hotel where we had transferred after checking out of the Holiday Inn the previous day. Due to the extraordinary heavy traffic that commonly exists during this time of the day in the island, we got to the office at about 9:40 A.M.

We met with Dr. George Sammy, the Food Technologist at the University of the West Indies. He briefed us on their food science program which is quite small and limited to teaching of courses and some research. They offer 12 - 15 months diploma and 18 to 24 months Master's degree courses. Short course programs are provided whenever funds for such courses are available. He indicated that the courses are usually very beneficial and they would always like to conduct them if money can be made available.

Usually graduate students take food development products for their research thesis. Dr. Sammy indicated that among some of the things they are trying to do is to can the "Callallo", an indigenous soup. They would also attempt to process a frozen form of it. He thought that there was a need to examine the quality, e.g. texture, taste, of stored peanut products, especially when stored or purchased in plastic bags. We were also informed that a food microbiologist has just been hired by the department. His presence would complement their efforts in any food quality and safety work that may be undertaken in the future.

He expressed dismay over the lack of effective extension work to help pass the information developed by them to the users. There was an extensive discussion over the consumption survey. This was continued during a later discussion with the CARDI Director of Research, Dr. Parasram. At first they were skeptical about any more surveys by them but when I inquired about existing information about previous surveys, it appeared such information would be hard to come by. I assured them that we would not conduct any survey if existing information could be made available to enable us to make determinations on peanut consumption in the region. They backed down and suggested that only a limited survey should be carried out. Dr. Sammy indicated that he would be able to utilize some of his students as enumerators for the survey during their vacation time. They seemed to experience staff shortage and expressed the need for training of more staff. We informed him that training can be done under the Peanut CRSP project once such training needs are identified. He expressed the view that whenever that comes about, the training should be done partly at UWI and partly in the U.S.

In terms of some basic analytical equipment needed by them, they were asked to identify and prioritize them for our consideration. We were taken on a tour of their laboratory and food processing facilities.

9/22/83 A meeting with the Director of Research, CARDI, Dr. S. Parasram, who is acting as the Executive Director in the absence of Dr. J. A. Bergasse, started at about 9:00 A.M.

He began by challenging a general statement in the project proposal that said that malnutrition was a problem of high magnitude in all developing countries. He claimed that malnutrition was not such a problem in the Caribbean. He stated that if there was any problem related to malnutrition, it would be inadequate calories, minerals, and vitamins, but not protein shortage. In reviewing what he considered as a major problem, he cited marketing which he suggested required greater attention. As has previously been stated, he showed no enthusiasm about any surveys. He claimed that many surveys had been conducted in the past. He could not assure us that information from such surveys could be readily available. However, in the absence of such previous survey information relevant to peanut consumption, he accepted the plan to conduct a limited survey in selected major producing and consuming countries of the region. He stressed the need for information exchange and dissemination among the cooperating scientists. He also expressed the need for bulletins on "how to" in the processing of peanuts and in the simple analytical techniques as these would aid in rapid extension of such information to users. He thought that the U.S. counterparts should help in getting such bulletins or brochures prepared.

On the issue of conducting the survey they accepted to develop the survey instrument. This is, however, to be based on the format developed by Alabama A&M for a similar work in the Sudan. A copy of that instrument was left with them.

The draft instrument should be ready before Christmas and would be submitted to AAMU for review and approval. It anticipated that the survey would be conducted during the Christmas holidays when the students that will assist in the survey would be on vacation. This arrangement is intended to help in cutting down the cost. Along with submitting a draft of the survey instrument, they are to provide an itemized estimate of what the survey will cost and thus define fairly clearly the scope of the survey, i.e., the extent of coverage in each of the islands to be surveyed.

The Plan of Work-Host Country Memorandum of Understanding was not signed because Dr. Parasram wanted the detailed first year plan of work to be part of the MOU or at least to form part of it as an appendix. This, according to him, would enable them to know exactly what their responsibilities would be during the period. He thought that the Plan of Work MOU was too general. It was pointed out to him that the MOU was supposed to be general in nature to provide sufficient flexibility for the necessary research to be conducted and for appropriate modifications to be made whenever necessary.

It is to be noted that the MOU would not be up for signing until the survey instrument has been developed and approved. They seemed uninterested to discuss other aspects of the work since the survey should form the basis of most of what would be taking place. However, Dr. Sammy said he would like to see the product development part started. Of course, in the sequence of the expected research, product

development should come after indigenous peanut product modifications. At present there is no evidence of any indigenous food item in which peanut forms a part. As indicated earlier, there is considerable interest in aflatoxin monitoring and existing snacks quality assessment. Dr. Parasram thought that this aspect of the work could begin without delay. Samples are to be provided to the University of Florida for such assessments.

There was some discussion on how to deal with the UWI since Dr. Sammy is a faculty member of UWI rather than a staff of CARDI. They would probably request the University to second him to CARDI for the purpose of the peanut food technology project. They assured us that they would work that problem out. We also requested that they make the determination as soon as possible including the clear identification of any other person or persons among their staff or from the UWI that would be involved in the project. Their role should also be defined. Our meeting with him took both morning and afternoon hours and was the last official business conducted with them.

9/23/83 We left Trinidad in the morning arriving in Barbados at about 12 noon. We had a quick lunch and after checking with the USAID Mission, we were told that both Mr. Hughes and Mr. Harrington would see us at 1:30 P.M. We had a very good meeting with them. As was necessary we briefed them on our meetings with CARDI staff and what had been planned for the future. They expressed considerable interest in the

peanut work in the region. They urged us to ensure that the survey was not entirely left to CARDI to conduct as it would likely get bogged down, as previous experience in the farming systems research survey showed.

They gave us some background on AID programs and other development activities in the region including the farming systems research and extension for which about \$7.5 million is being provided for five years. Mr. Hughes informed us that Mr. Don Harrington would be the new contact person for the Title XII related activities in the region. Some other individuals such as Mr. Jethro Green, a rural development specialist in St. Vincent, and Dr. Lacksman Singh, also in St. Vincent, were recommended as good contacts with interest and expertise on peanuts. Our meeting with them lasted till about 4:15 P.M.

9/24/83-We spent most of the morning, which was the only time stores were open, trying to see if we could find some "made in Barbados" before we left.

We had been scheduled to leave Barbados on Monday, 9/26/83 but since we did not find any reason to stay till Monday, as we were able to finish our discussions with the USAID people on Friday, we were lucky to get in on a flight to Miami on Sunday morning 9/25/83, arriving Huntsville at about 6:51 P.M.

Table: Peanut Production and Utilization Activities
in the Caribbean

	<u>Producer</u>	<u>Importer</u>	<u>Consumer</u>	<u>Exporter</u>	<u>Processor</u>
*Antigua	x	x	x	-	-
*Barbados	x	xx	xx	-	-
Belize	xxx	xx	xxx	-	x
*Dominica	-	x	x	-	-
Grenada	-	x	x	-	-
Guyana	x	-	x	-	-
Jamaica	xxxx	x	xxxx	-	xxxx
*Montserrat	x	x	xx	-	-
*Nevis/St.Kitts	xx	-	x	x	-
*St. Lucia	x	xx	xx	-	xx
*St. Vincent	xxx	-	xx	xx	x
Trinidad/Tobago	-	xxxxx	xxxxx	-	xxxxx

Legend

-
x
xxxxx
*

Activity Level

Nil
Lowest
Highest
Places where Farming Systems
Research Projects are sited
at the present time.

PEANUT CRSP
TRIP REPORT

Traveller: Dr. B. Onuma Okezie, Director
Office of International Programs

Places Visited: Trinidad/Tobago, St. Vincent and Barbados

Period Covered: December 12 to 19, 1983

Purpose of Trip: (1) To finalize the food consumption survey instrument with
CARDI counterparts.
(2) To pre-test the instrument in Trinidad and St. Vincent.
(3) To sign the Host-Country Plan of Work.

Executive Summary

The objectives of the trip were accomplished. The draft survey instrument underwent no modifications before the pre-test which was completed with cooperation from the Caribbean Food and Nutrition Institute (CFNI). Useful suggestions for some modifications of the instrument were obtained through the pre-test from both the staff of CARDI and the CFNI and the respondents. Similar useful inputs were elicited as a result of the pre-test in St. Vincent.

Plans for the actual survey for end of February/early March, 1984 were initiated both in Trinidad and St. Vincent.

The Host Country Plan of Work MOU was finally signed after some changes which were incorporated as part of the appendix.

Met with Mr. Bill Baucom of the USAID, Barbados and had useful discussions with him on AID activities in the region. I briefed him on my trip outcome and on the general progress of the CRSP efforts in the region.

Detailed Trip Report12/12/83

Departed from Huntsville about 6:00 a.m. and arrived Port of Spain about 7:25 p.m. The conflicting communication from AID Mission, Barbados and Alabama A&M about my arrival time in Trinidad resulted in nobody being at the airport to pick me up as had been previously arranged. Also, because CARDI had accepted to make hotel reservations for me and since they were not at the airport to meet me, I did not have a place to stay. However, after waiting for almost 3 hours at the airport with the hope that they might come, as I did not have any CARDI official's home phone number, I finally hired a taxi to take me first to try and see if there would be some information at CARDI office; and when we failed, we started checking some hotels for sleeping accommodations. We finally succeeded at the Holiday Inn.

12/13/83

Took a taxi to CARDI office. Met with Dr. Haque and Dr. Walmsley. After a brief discussion on my visit and its activity plan, we went to see the Senior Common Room where they had made reservations for me. It was about noon and since I had to check out from the Holiday Inn before moving into this other place, we drove to downtown to check out from the hotel.

We got back to the office after lunch. I met with Mr. Richard Carew, Agricultural Economist, CARDI, whom Dr. Walmsley had said had conducted some agricultural/socio-economic surveys recently. Mr. Carew suggested we go to the Caribbean Food and Nutrition Institute (CFNI) to see Mr. Curtis McIntosh, another agricultural economist who has conducted or is still conducting some food consumption and nutrition surveys. My visit with these two gentlemen was very fruitful as they represented the first contact with people who could

make some substantive if not necessary inputs into the survey instrument as they relate to the entire area. They made good suggestions for identifying subjects for the pre-testing and seemed to be interested in assisting to identify the enumerators for the survey. Mr. Carew made good suggestions for modification of the questionnaires. He accepted to assist Dr. Walmsley in identifying the enumerators and possible respondents through information from the Central Statistical Office in St. Augustine. Some of the enumerators that both Mr. Carew and Mr. McIntosh have been using in their various surveys would be co-opted for the survey.

12/14/83

Most of the day was spent on the pre-testing of the instrument. Staff of CARDI and the University of the West Indies were used. Some of the test respondents preferred to fill out the forms which were distributed in the morning and then collected during the afternoon. The questionnaires were discussed with all those who had comments and suggestions for modifications.

12/15/83

The Host-Country Plan of Work MOU was the subject of discussion with CARDI officials for most of the morning before leaving for the airport. The signing had been delayed because Dr. Parasram, who was to be one of CARDI's signatories was out of town. For the signing, I met him, Dr. Haque and Dr. Bagassee. They came up with more modifications in the MOU which would result in further signing delays. I insisted that they should sign what has been prepared and later we could amend it. The issue was resolved by including the changes as an appendix to the MOU. They were unable to resolve the issue of how to involve Dr. George Sammy from the UWI on the project and finally decided to exclude him. This meant changes in the levels and types of effort to be handled by host country counterparts. The major changes on the Plan of Work provide that:

1. Quantitative and qualitative analysis for peanut contamination, particularly for aflatoxin will be conducted in the U. S. by the University of Florida. CARDI will be responsible for providing samples to Florida for the analysis. Florida is to indicate appropriate sample sizes to be collected and provide necessary clearance papers, especially for raw fresh peanuts from USDA quarantine division.

2. Florida is to carry out the Product Development work and will emphasize (a) baby foods development with peanuts. (b) School lunch type foods suitable for mass distribution for the school lunch programs.

3. Development of cottage industry processing techniques to be done by the University of Florida.

4. Consumer acceptability and nutritional quality assessment to be carried out by CARDI.

Dr. Don Walmsley and I left for the airport at about 11:15 a.m. Our plane for St. Vincent was late in taking off. We arrived Georgetown, St. Vincent about 1½ hours late, hence we missed Mr. Bishop, who was supposed to meet us at the airport. After checking into the hotel, we went to CARDI office in Georgetown to meet the staff and to plan the pre-testing of the survey instrument. Unfortunately Mr. Clive Bishop, who was supposed to be our contact had gone home for the day. However, we met with Mr. Noel Kirton who is the CARDI Team Leader in St. Vincent. We explained the purpose of our visit and what the Peanut CRSP in the region is all about. We also met and discussed with Mr. A. George Varkey, Advisor in Post Harvest Technology to CARDI. Dr. Varkey is assigned to CARDI by FAO/WHO.

12/16/83

Dr. Walmsley and I walked to the CARDI office from our hotel at about 8:00 a.m. and while we waited for Mr. Bishop to arrive, I decided to follow

the staff who were going to the field to monitor their experiments with a view, perhaps, to finding some local farmers whom I could use for testing the questionnaires. By the time I came back, Mr. Bishop had come to the office. We discussed the program at hand and worked out a procedure for conducting the pre-test. We left with him to test some in the town. We also went to the Ministry of Agriculture where we met with Messrs. Hugh Philips and Ken Bonidia under advice by USAID Barbados with which I had communicated over the phone earlier in the morning. I explained the Peanut CRSP program to them. They expressed interest in the program and pledged their support for the activities, including assistance in the food consumption survey. I also took the opportunity to meet with Mr. Mike Maxey, the USAID Agricultural Officer, who was visiting St. Vincent. They took us to the Office of Rural Development (ORD) where we got some of the instruments tested. The staff of the Ministry of Agriculture and ORD offered useful comments about the questionnaires.

We visited one of the prominent local peanut farmers who is cultivating about 100 acres (2nd cropping) of peanuts, Mr. Murray Hadaway. He was very hospitable and offered to take us back to the hotel. In fact, the following morning he took us to the airport. He was indeed very helpful with the questionnaire and pledged to cooperate in whatever way possible in our work any time.

The plan for the survey in St. Vincent was discussed with Mr. Bishop and details will be worked out later before the actual survey sometime in February or early March, which is the second peanut harvest season in the area.

12/17/83

Although I was scheduled to leave St. Vincent for Barbados at about 7:15 a.m., we could not depart until about 8:05 a.m. Inter-Island flights in the region are usually not on time, so this little delay was expected.

On arrival at the Holiday Inn in Barbados, Mr. Bill Baucom of the USAID, Barbados was already there to meet me. I had earlier the previous day from St. Vincent called to tell him when I was arriving. We had very useful discussions on the peanut program for the region and some of the things they are planning and doing for the area, including Grenada, where he indicated that about \$20 million has been earmarked for that country's development. Most of this money will go to the development of infrastructure, including roads. About \$2 million will be spent this year for agriculture.

Mr. Baucom was very helpful in finding me alternative hotel accommodations, as it appeared that the Holiday Inn did not seem quite convenient.

12/18/83

Most of the day was used in reviewing the pre-test survey results. Although I was able to move up my schedule and saw USAID mission staff on arrival on December 17th instead of on December 19th, I could not get reservations to leave any earlier than Monday, December 19, 1983.

12/19/83

I had arranged to use the morning to visit some farm areas in the southeast where some peanuts are grown. Peanut production in Barbados is on a very limited scale and its consumption is also minor. My flight was scheduled for departure at 10:25 a.m. but did not leave until about 11:30 a.m. I arrived back in Huntsville at about 7:15 p.m.

* * * * *

REPORT OF TRAVEL REGARDING THE PROJECT ENTITLED:
PEANUT UTILIZATION IN FOOD SYSTEMS IN DEVELOPING COUNTRIES
(AAMU-FL/FT/CARDI)

TO
TRINIDAD, ST. VINCENT, BARBADOS, JAMAICA
MAY 15 - 26, 1984

BY
Dr. B. Onuma Okezie, Food Scientist
Dr. Virginia Caples, Home Economist
Dr. G. C. Wheelock, Rural Sociologist
Dr. Hezekiah Jones, Agricultural Economist
Dr. Bharat Singh, Food Scientist

ALABAMA A & M UNIVERSITY, NORMAL, ALABAMA 35762

AN ACTIVITY REPORT FROM PEANUT CRSP
INTERNATIONAL PROGRAMS, ALABAMA A & M UNIVERSITY
SUPPORTED BY GRANT USAID/DSN N-G-0247

TABLE OF CONTENTS

- 1.0 Purpose of Travel
- 2.0 Executive Summary
- 3.0 Itinerary
- 4.0 Acknowledgment
- 5.0 Arrival at CARDI offices at the University of West Indies, St. Augustine, Trinidad; Activities in Trinidad: B. O. Okezie, V. Caples, G. C. Wheelock
 - 5.1 Briefing on Survey Plan by Dr. Walmsley and CARDI Staff
 - 5.2 Training of Enumerators: Sampling and Interview Questionnaires
 - 5.3 Editing and Coding on Completed Questionnaires
 - 5.4 UWI Computer Centre Assistance
 - 5.5 Preliminary Survey Report
 - 5.6 Meeting with Dr. George Sammy Regarding Peanut Product Development and Survey Findings
- 6.0 Activities in St. Vincent: B. O. Okezie and V. Caples
 - 6.1 Arrival in St. Vincent: Meeting with Mr. C. Bishop
 - 6.2 Organization of the Survey
 - 6.3 Editing and Reviewing of the Completed Questionnaires
 - 6.4 Meeting with Mr. G. R. Vanluo, Chief Agricultural Officer, and Mr. Kenneth Bonadie, Deputy Agricultural Officer
- 7.0 Activities in Barbados
 - 7.1 Meeting with Mr. Don Harrington, Assistant Agricultural Development Officer and Mr. Steven Szadek, Acting Agricultural Development Officer.
- 8.0 Activities in Jamaica: B. Singh and H. Jones
 - 8.1 Meeting with Mr. Horace Payne and Mr. Joseph R. R. Suah
 - 8.2 Organization of the Survey in Kingston
 - 8.3 Training of Enumerators
 - 8.4 Editing and Rechecking of the Completed Survey Questionnaires
 - 8.5 Survey Plan for Rural Area

- 8.6 Meeting with Mr. Suah and Mr. Payne to Discuss CRSP Programs in Detail
- 8.7 Meeting with Mr. Kenneth Leslie (Agricultural Economist) and Sallie Campbell (Nutritionist).
- 8.8 Organization of Survey in St. Elizabeth Area (Rural Site)
- 8.9 Recommendations

1.0 Purpose of Travel

1. To conduct a peanut product consumption survey in St. Augustine, Trinidad (an urban site) for the purpose of planning future collaborative research on peanut product improvement or new product development and utilization.
2. To conduct peanut consumption and post harvest surveys in Kingstown, St. Vincent (in urban and rural areas) for the purpose of planning future collaborative research on peanut product improvement or new product development and utilization.
3. To conduct peanut consumption and post harvest surveys in Jamaica (in urban and rural sites) for the purpose of planning future collaborative research on peanut product improvement or new product development and utilization.

Executive Summary

The objectives of this trip as outlined in the preceding section were accomplished. Drs. Onuma Okezie and Virginia Caples supervised the completion of the survey in an urban site, Kingstown, and rural site near Kingstown in St. Vincent Island. Kingstown, St. Vincent was divided into 11 (eleven) clusters and rural peanut producing areas into 8 (eight) clusters. The completed questionnaires, 424 for consumption and 210 for post-harvest handling of peanuts and peanut product samples were brought by the team to Alabama A&M for analysis and interpretation. The survey in St. Augustine, Trinidad was supervised by Dr. G. C. Wheelock. In addition to completion of the survey, Dr. Wheelock with host country counterparts also completed editing, coding, and processing of the survey data from Trinidad. A plan for collaborative research in Trinidad has also been discussed. Dr. Singh and Dr. Jones, with excellent collaboration with Mr. Horace Payne and

Mr. Joseph Suah of CARDI, completed consumption survey in 8 (eight) different zones of the City of Kingston (Jamaica) and 11 extension areas in St. Elizabeth Parish in Jamaica. St. Elizabeth Parish represents peanut producing areas of Jamaica. The personal observations indicate that Jamaica produces a significant amount of peanuts in the Caribbean region. In urban areas peanuts are consumed by almost everyone; however, the cost and availability of peanuts and peanut products are prime reasons for less utilization of peanuts. It was further noted that there is sufficient interest in CARDI staff members in Jamaica to continue research on post-harvest handling, including storage and processing of peanuts in Jamaica. It also seems possible to receive cooperation from the Ministry of Agriculture, Food Nutrition Institute and Food Technology Institute.

3.0 Itinerary: Dr. Wheelock

- May 15 The AAMU Peanut CRSP survey team - Drs. Caples and Okezie (St. Vincent), Wheelock (Trinidad), Jones and Singh (Jamaica) left Huntsville at 7:00 a.m. The team split in Miami for Trinidad and Jamaica destinations. Caples, Okezie, and Wheelock arrived in Trinidad at about 6:30 p.m. where they were met by Dr. Walmsley.
- May 16 Reviewed survey plans with Trinidad CARDI staff - Dr. Walmsley, Joan Sanchez (survey statistician), and Merl Boodoo (research assistant). Met eleven enumerators and conducted training on sampling and interviewing procedures.
- May 17 Edited and coded the first two questionnaires for each of nine enumerators. Assigned four additional sample households for each enumerator.
- May 18 Met with CARDI statistician Brian Luckner and UWI computing center staff. Mrs. Sanchez arranged to start key punching the data Monday, May 21 on a daily basis.

Dr. Okezie and Dr. Caples

- May 16 Dr. Caples and Dr. Okezie and Mr. Walmsley (CARDI) left for St. Vincent and arrived in Kingstown.
- May 17 Meeting with Mr. C. Bishop
- May 18-20 Planning of Survey and Training of Enumerators

May 21-22 Editing of Completed Questionnaires

- May 23 Meeting with Mr. G. R. Vanluo, Chief Agricultural Officer and Mr. Kenneth Bonadie, Deputy Agricultural Officer
- May 24 Dr. Caples left for Huntsville, AL
Dr. Okezie left for Barbados
- May 25 Meeting with Mr. Don Harrington, Assistant Agricultural Development Officer and Mr. Steven Szadek, Acting Agricultural and Rural Development Officer
- May 26 Dr. Okezie left for Huntsville

Dr. Singh and Dr. Jones

- May 15 Arrived Kingston, Jamaica at 1:55 p.m.
- May 16 Meeting with Mr. Horace Payne and Mr. Joseph Suah of CARDI
- May 17 Meeting with Mr. Payne and Mr. Suah and planning of survey and training of enumerators
- May 18-20 Completion of Survey in Kingston
- May 21 Planning survey in rural area with Mr. Payne
- May 22 Trip to Santa Cruz
- May 23 National Holiday; however, survey continued
- May 24 Meeting with Mr. Suah and Mr. Payne to outline future research on peanut utilization in Jamaica
- May 25 Travel to Santa Cruz to collect completed questionnaires and complete editing
- May 26 Dr. Singh and Dr. Jones left Kingston for Huntsville
- May 21-24 Completed enumeration and coding of 180 peanut utilization household interview schedules.
- May 25 In spite of power failure the entire morning, all data were key punched and a listing of all data and frequency distributions were completed by 6:30 p.m. In the evening, accompanied by Selby Alfred, Wheelock visited Dr. George Sammy and discussed the survey and project plans. He expressed an interest in coming to the peanut meeting this summer, as suggested to him by Dr. Cummins.
- May 26 Departed Trinidad at 7:00 a.m. and arrived Huntsville at 8:00 p.m.

4.0 Acknowledgement

Prior arrangements made in Trinidad by CARDI Peanut CRSP coordinator, Walmsley with Mrs. Joan Sanchez, CARDI survey statistician and Miss Merl Boodoo, Research Assistant, to assist with the survey were excellent. Mrs. Sanchez provided excellent coordination with enumerators and with the UWI computing center and Miss Boodoo had provided census enumeration maps and had randomly sampled households from the entire survey area. She also provided excellent assistance in supervising enumerators and in editing and coding the completed survey instruments. Dr. Sinclair Ford, Dr. Osuji and other CARDI staff made the survey team feel at home and provided an excellent working environment. The cooperation of nine survey enumerators - Stancia Cornwall, Kathleen Rose, Camille Antoine, Alfred Francis, Selby Alfred, Carmichael Khan, Joseph Barbaste, Dave Miller, and Paul Badre Singh - was especially appreciated. The hospitality and discussions with Dr. George Sammy and other food technologists were also appreciated by Dr. G. C. Wheelock.

The team members thank the CARDI staff in St. Vincent and Mr. C. Bishop from St. Vincent for their cooperation and assistance throughout the survey, and Mr. G. R. Vanluo and Kenneth Bonadie for providing useful information on peanut production and utilization in St. Vincent. Dr. Okezie thanks Mr. Harrington and Mr. Szadek of the USAID Mission for their interest in the project.

Dr. Singh and Dr. Jones are thankful to Mr. Joseph Suah and Mr. Horace Payne of CARDI, Jamaica for their hospitality and excellent cooperation.

5.0 Arrival at University of West Indies, St. Augustine, Trinidad

Drs. Wheelock, Okezie, and Caples departed Huntsville, AL at 7:00 p.m. and arrived in Port of Spain at 7:00 p.m. They were met by Dr. Walmsley, CARDI agronomist and collaborator on the project. They proceeded to the Senior Commons Room near the UWI campus where rooms had been reserved and where they met Dr. Curtis McIntosh, Food Economist, UWI, and Dr. P. Osuji, CARDI scientist.

5.1 Briefing on Survey Plan by Dr. Walmsley and CARDI Staff

Wednesday morning the AAMU team, Drs. Wheelock, Caples and Okezie, met with the CARDI team coordinator, Dr. Walmsley, Joan Sanchez, and Merl Boodoo. Sampling plans were discussed. Census enumeration maps of the proposed survey areas - Tunapuna, St. Augustine, and Cuepeo had been secured and households had been randomly selected (6 households from each of 55 maps)! The entire area within easy access of the University is known to be closely representative of Trinidad population in general. The samples from the 55 maps were divided into three approximate income strata - high, medium, and low. It was decided to monitor the survey returns daily to be sure that all income strata would be represented with at least 30 to 50 households.

Dr. Okezie visited Mrs. Johnson of the Bursar's Office, University of the West Indies, St. Augustine, to determine the status of a modified version of the MOU with CARDI that will provide for the UWI's participation in the CRSP independent of CARDI. This arrangement was begun by Dr. Cummins during his visit to Trinidad in April. It was indicated that they were still working on the document left behind

by Dr. Cummins and that as soon as all the appropriate people, including Dr. Sammy, who needed to review it had done so, they would return it to Dr. Cummins.

5.2 Training of Enumerators: Sampling and Interview Questionnaires

Eleven potential enumerators met with the team Wednesday afternoon. Training in both sampling procedure (map reading) and administering the survey instrument was conducted. At the conclusion of a two hour session each enumerator was assigned two households on one map to be completed by the following morning. Nine of the eleven enumerators returned with the completed schedules, but two decided not to participate. Wheelock and Boodoo went over the returned schedules with each enumerator correcting data collection procedures and editing any unclear responses. This procedure was repeated with four additional households for each enumerator on the second day. By Monday, all enumerators had completed six households and three had completed 12. The supervisors had also edited all completed schedules in conference with each enumerator. The map locations of the households interviewed were also verified. In case the households were not at home, enumerators were instructed to return to the specified households until either the male or female head could be interviewed. Only in case of vacancies, the household to the left of the sample household was to be questioned.

5.3 Editing and Coding Of Completed Interview Questionnaires

Editing of completed survey schedules was done in conference with each enumerator as described above. Based on the first 50 returns, the coding procedure was fully developed by Tuesday. The codes are

attached. From this point on, coding was incorporated into the editing process. Three of the enumerators were subsequently trained to transfer the coded data from schedules to transfer sheets.

5.4 UWI Computing Center Assistance

Mrs. Sanchez and Brian Luckner, CARDI statisticians, provided entry into the computing center. Wheelock transferred the coded schedule into SPSS code and Mrs. Sanchez assembled the data files and computer runs each day. The first page of the schedule included data necessary to monitor sample representativeness and enumerator records. This subset of variables was processed daily. The entire set of 180 schedules was key punched and a computer printout of over 100 variables was run by Friday, May 25 at 6:30 p.m. A complete data file is now available at CARDI for analysis, as well as at AAMU. Computing Center personnel were extremely helpful throughout the work.

5.5 Preliminary Survey Report

SPSS printouts of the frequencies are available at AAMU and CARDI. Interpretation and analysis will be developed at AAMU and CARDI (Table 1). Initially, further analysis will be done at AAMU and it is being requested that someone at CARDI or UWI be identified to collaborate. Mrs. Sanchez's further assistance will be invaluable in this regard.

5.6 Meeting with Dr. George Sammy Regarding Peanut Product Development and Survey Findings and Additional Information

After leaving the Computing Center, Wheelock accompanied by Selby Alfred, one of the enumerators and an agricultural engineering

graduate, visited Dr. George Sammy at his residence. Dr. Sammy had expected to hear from the University of Florida investigator on the project. He is expecting additional information on the peanut meetings this summer. He is also processing a memorandum of understanding with the Peanut CRSP through the UWI bursars office. He views peanut product development as a long range objective that would appropriately follow improvements in local productivity and profitable markets. In the meantime, home production and processing may be enhanced. He was not convinced that this process required "research". Peanut drinks, for example, have been researched and are now a matter of variations in formulation, testing, and marketing. A newspaper article which appeared in Trinidad newspapers during the survey emphasized home production and processing. (See Attachment 1).

The survey results will certainly confirm that home processing of peanuts - fried, roasted, or homemade peanut punch from milk and peanut butter (often facilitated with the use of an electric blender) is very important in the domestic diet. While gardening is gaining some popularity, very little, if any, peanut production is reported in the survey. The poorer households in the sample, however, often report lack of garden space.

Roasted peanuts and peanut butter are ubiquitous in stores throughout Trinidad. Like all food prices in Trinidad, peanut products are expensive. Household food expenditure surveys conducted at UWI and CARDI have found middle and low income families spend 2/3 or more of their income on food. Peanut products like most foods, depending upon the exchange rate used, were more expensive than in the U.S. One pound of peanut butter costs 9.50 TT\$ or \$4.00 US at the

official exchange rate. Even at commercial exchange rates, consumers were paying the equivalent of \$3 U.S. per pound of peanut butter. Roasted peanut prices are equally high. Nevertheless, economic studies show that it is cheaper to import the raw peanuts than to grow them domestically.

26	Q13 Food in Trade or Gifts Value Weekly (TT\$)	F3.0
	(Note: Survey No. and Card No.: 2 of 3 (F4.0, F1.0))	
27	Q14 Consume peanuts Yes=1; No = 0	F1.0
28	Q15 Peanuts Stored for <u>Home Consumption</u> (lbs.)	F1.0
29	Q15 Sale? (lbs)	F1.0
30	Q15 Seed? (lbs)	F1.0
31	Q16a Peanut Oil = 1; Else=0	F1.0
32	Q16b Raw = 2	F1.0
33	Q16c Boiled = 3	F1.0
34	Q16d Roasted = 4	F1.0
35	Q16e Fried = 5	F1.0
36	Q16f Peanut Butter = 6	F1.0
37	Q16g Candy = 7	F1.0
38	Q16h Ingredient=Peanut Punch=8	F1.0
39	Q16i Other = 9 (Fried)	F1.0

40-59 Q17a-d Product Preference Snack for each group of family members

a) 1st digit (use code from 16a-i above)

b) 2-3 digits (number of days peanut snack eaten 1-30)
4(F1.0,F2.0,F1.0)

c) 4 digit (preference rank for peanut snack)

b) 5 & 6 digit (number of days peanut butter eaten)
4(F2.0, F1.0)

d) 7th digit (preference rank for peanut butter among spreads)

Group 1 = Male Head

Group 2 = Female Head

Group 3 = Children over 10 Group 4 = Children under 10

		<u>Amount(lbs)</u>	<u>Value(TT\$)</u>
60-61	Q18 Raw, in shell	(F3.1)	(F3.1)
62-63	Q18 Raw, shelled	(F3.1)	(F3.1)
64-65	Q18 Roasted, in shell	(F3.1)	(F3.1)
66-67	Q18 Roasted, shelled	(F3.1)	(F3.1)

Note: Survey No. and Card No.: 3 of 3 (F4.0, F1.0)

		<u>Amount(lbs)</u>	<u>Value(TT\$)</u>
68-69	Q18 Fried	(F3.1)	(F3.1)
70-71	Q18 Ground	(F3.1)	(F3.1)
72-73	Q18 Peanut Butter	(F3.1)	(F3.1)
74-75	Q18 In Candy	(F3.1)	(F3.1)
76-77	Q18 Other (Peanut Punch) gal.	(F3.1)	(F3.1)
78	Q21 Prepare peanut products at home =1 Buy finished peanut products = 2		(F1.0)
79	Q22 or Q23 Reasons for not consuming more peanuts 1 Diet balanced enough 6 Fattening & Expensive 2 Fattening 7 Not in Store; Not Routine 3 Don't like it; poor taste 8 Allergies; Diabetic 4 Blood Pressure 9 Difficult to prepare 5 Cost 0 None		(F1.0)
80	Q24 How do you feel about peanuts as a food? Q24a Plentiful = 0; or scarce = 1		11(F1.0)
81	Q24b Nutritious = 0; or not nutritious = 1		
82	Q24c Contaminated = 0; or clean = 1		
83	Q24d Expensive = 0; or inexpensive = 1		
84	Q24e Healthy = 0; or unhealthy = 1		
85	Q24f Full = 0; or empty = 1		
86	Q24g Unsafe = 0; or safe = 1		
87	Q24h Strong = 0; or weak = 1		
88	Q24i Easy Preparation = 0; or difficult preparation = 1		
89	Q24j Tasty = 0; or not tasty = 1		
90	Q24k Bland = 0; or not bland = 1		
91	Q25 Read Newspaper Yes=1; No=0; Occasionally = 2		F1.0
92	Q26 Listen to Radio Yes=1; No=0; Occasionally = 2		F1.0
93	Q27 Watch TV. Yes=1; No=0; Occasionally=2		F1.0
94	Q28 What is your main source of information for: Q28a Nutrition Q28b Food Preparation		4F1.0

Q28c Family Budget
Q28d Farming and Gardening
Informal, family & friends = 0
Newspaper, Books, Reading = 1
TV, Radio only = 2
Nothing, not interested = 9

6.0 Activities in St. Vincent: B. O. Okezie and Virginia Caples

On May 16 Drs. Caples, Okezie, and Walmsley left for St. Vincent.

6.1 Meeting with Mr. C. Bishop

Contact was established with Mr. C. Bishop, the project contact in St. Vincent, by Dr. Walmsley who travelled with the team to St. Vincent.

6.2 Organization of the Survey

Mr. Bishop spent most of the morning hours in contacting the enumerators that he had organized. These were brought together that afternoon for training. There were about twenty enumerators who were trained. Eleven of these were assigned to the peanut consumption survey in the urban (Kingstown) area and the other nine were assigned to the rural areas. Each enumerator was assigned to a predetermined section of the urban area whereas each rural area enumerator was assigned to survey an already randomly selected list of farmers for the consumption and post harvest surveys. Each of the enumerators was assigned an area and given two consumption questionnaires for the urban, and two consumption and two post harvest questionnaires for the rural area for trial with real respondents. They were scheduled to come back the next day for a review of their performance with the survey questionnaires and to work out any problems that they might have experienced in administering the questionnaires. At the end of that review session, more questionnaires were issued to each of the enumerators for full scale survey of their respective areas.

Editing and Reviewing of the Survey

On May 18, appointments were set up for each of the enumerators for the review of their trial survey instruments. At the end of each enumerator's review, sufficient questionnaires for an area were issued to

those who did not have much difficulty in their trial survey. For those who still appeared to have problems, fewer forms were issued to them and they were required to come back for review of those questionnaires after completion. This routine was to ensure more accuracy in enumeration and to avoid having to ask an enumerator to go back for more information or better clarifications on ambiguous answers over large numbers of respondents.

For the rural enumerators a central place, a sort of rendezvous, was identified and times set up for them to meet the supervisory team there. Two enumerators could not meet the team on Saturday because they are Seventh Day Adventists. The supervisory team had to go to their home on Sunday to review their trial surveys and to issue them with new questionnaires.

During the period May 21 - 24, the enumerators came back with their finished questionnaires for review. Those that were improperly filled or those that contained ambiguous information were returned to the enumerators who were required to go back to the respective respondents for necessary clarifications or completion. Many times these reviews continued very late at night.

6.4 Meeting with Mr. G. R. Vanluo, Chief Agricultural Officer and Mr. Kenneth Bonadie, Deputy Agricultural Officer

On Wednesday, May 23 Dr. Okezie and Dr. Caples met with officials of the Ministry of Agriculture, Messrs. G. R. Vanluo, Chief Agricultural Officer, and his Deputy, Kenneth Bonadie. The purpose of the meeting was to brief them on the activities related to the Peanut CRSP in the region and to find out what, if any, their agricultural programs (present and future) were, particularly as they relate to peanut production and utilization. A five year development plan was said to be envisioned in which they hope to

increase the area of peanut production from the present 100 acres to 300 acres. They said that they were in the process of signing a bilateral agreement with the USAID (this was later confirmed during a meeting with Dr. Okezie and USAID Mission officials, Messrs. Harrington and Szadek in Barbados during his exit briefing visit). Among the problems of peanut production in St. Vincent as seen by the Ministry is marketing. At the moment, they only sell to Guyana. Other CARICOM countries obtain cheaper peanuts from the U.S.A. So, the St. Vincent Marketing Board, which is the major if not the only buyer from the farmer, is often stuck with the produce that it could not sell to that one market.

After explaining various aspects of the Peanut CRSP to them, the team wanted to know what level of trained manpower that the ministry might have which could be made available for participation in the project under the umbrella of CARDI, which is the official host country collaborator. Such trained manpower in the food area did not seem to exist. However, they expressed deep interest in involvement and pledged to cooperate with CARDI in whatever was needed to be done in their country. They also indicated interest in training their people in this area. They requested a copy of the project objectives, which we arranged and provided to them the following day. During the discussion that ensued after glancing through the document, Mr. Bonadie, who was asked to meet with the U.S. team, indicated that many of the objectives of the project were in agreement with their project plan objectives and interest. However, they would study the document and send their response to AAMU on how they hope to cooperate with us on the project.

Dr. Caples departed on Thursday morning to return to the U.S. The last enumerator submitted his papers at about 2:45 p.m. Dr. Don

Walmsley, who had travelled with the team from Trinidad and helped to make the organizational arrangements before our arrival, left at 5:00 p.m. for another assignment in St. Lucia. Dr. Okezie tidied up the rest of the activities with the assistance of Mr. Clive Bishop who was the St. Vincent contact person on the project. Mr. Bishop worked very hard in organizing or identifying the farmers who had to be surveyed, and in selecting the enumerators, all of whom did an excellent job.

Last Day in St. Vincent

Dr. Okezie and Mr. Bishop visited Mrs. Adeline John, a homemaker who was recommended as the foremost lady in formulated traditional foods and baked products. Useful discussions were held on the various local foods in which peanuts are or could be used. She provided the team with a recipe for the preparation of peanut sugar cake. This recipe is reproduced below.

Dr. Okezie left for Barbados at about 8:30 p.m. on Thursday, May 24.

7.0 Activities in Barbados: B. O. Okezie

Dr. Okezie met with USAID Mission representatives Mr. Don Harrington, Assistant Agricultural Development Officer and Mr. Steven Szadek, Acting Agriculture and Rural Development Officer at about 10:20 a.m. He briefed them on the status of the Peanut CRSP in the region, particularly as it related to the consumption and post harvest surveys. They expressed interest in getting information on the results whenever they are ready. They also confirmed the plan to sign a bilateral agreement with the government of St. Vincent any time from now. The agreement will center on four major crops - peanuts, onions, sweet potatoes, and carrots. It will deal with improvement in production and the introduction of cultivators. The MOA and CARDI, working through the Organization for Rural Development (ORD) will be involved in the project. This was a very useful meeting, as

it provided the opportunity to learn of some of the USAID objectives in the region. The meeting lasted for about 1½ hours.

On May 26, Dr. Okezie departed from Barbados at about 9:00 a.m. and arrived Huntsville at about 8:25 p.m. with completed questionnaires and peanut samples.

8.2 Organization of the Survey in Jamaica

On May 17, Drs. Singh and Jones arrived at 8:00 a.m. in the CARDI office and discussed the areas to be included in the survey. Based on the advice of the town planners, the greater Kingston area was delineated in zones representing high, middle, low income areas. Each zone was considered a cluster, and the clusters selected for survey were:

Hope Pastures, Aylsham (Upper);

Meadowbrook, Mona Heights, and Harbor View (Middle Income); and

Independent City, Duhaney Park, and Stand Pipe (Lower Income)

8.3 Training of Enumerators

All enumerators arrived by 10:00 a.m. on May 17. After preliminary discussions the purpose of the survey was explained and the survey instrument reviewed. In their training session in the afternoon, enumerators were allowed to review the questionnaires and clarify the problems.

On May 17, Dr. Jones proceeded with four (4) enumerators to Independent City and Dr. Singh with three (3) of the enumerators to Harbor View. This was done to ensure the quality of the data collected. Each enumerator conducted at least one household in his area of assignment in the presence of either Dr. Singh or Dr. Jones. The major problem encountered was about the information on age of the persons and personal income status. Some respondents were also sensitive about the question on

ethnic origin. In general, enumerators did well in getting the information. The team assembled in the evening and discussed the problem of each enumerator. Each questionnaire was carefully reviewed and edited. In a few cases, enumerators were advised to return to the household and to get the missing information. The enumerators realized that the working people are generally not at home during the day time and they expressed the opinion that data collection should continue on Saturday and Sunday. To this we readily agreed, as it would help to reduce bias. In the evening, Jones and Singh visited Mr. Rudolph Daley, Horticulturist, and a friend of Dr. Jones. Mr. Daley proved to be very resourceful to us in many ways.

8.4 Editing and Reviewing of the Completed Questionnaires

The enumerators assembled on Saturday, May 19, morning in the lounge of the Senior Common Room of the University of West Indies and, after a brief discussion, they again went to their respective areas to continue data collection. CARDI was unable to provide transportation over the weekend so each enumerator was given an allowance to cover bus fares. Drs. Singh and Jones met them again on Sunday, May 20 at 10:00 a.m., edited the completed questionnaires and handed out questionnaires to be administered that day.

On May 21, again Drs. Jones and Singh met with the enumerators at 8:30 a.m., reviewed and edited the questionnaires that were completed on Sunday and handed out questionnaires for the remaining clusters. Data collection in Kingston was completed by Tuesday.

8.5 Survey Plan for Rural Area

On May 21, Jones and Singh met with Mr. Horace Payne and discussed the survey in the rural area. It was not possible to visit the rural area until Tuesday morning. The area selected for the survey was the

Parish of St. Elizabeth. This is the main peanut growing area of Jamaica. Mr. Payne had already contacted the officer in charge of the Parish, Mr. M. A. Montague for the arrangement of the survey. It was already planned that the survey will cover a wider range of farming systems.

Dr. Jones, Dr. Singh, and Mr. Payne travelled to Santa Cruz on May 22, where the office of the St. Elizabeth Land Authority is located. On their way to Santa Cruz, the team visited a farm where peanuts were planted only a week ago. The farm appeared to be well managed and from all accounts, the farmer was encouraged to grow more peanuts to meet the increasing demand for peanuts in the country. This farmer uses an irrigation system to maintain adequate moisture levels.

The team arrived Santa Cruz at 11:00 a.m. Mr. Montague and the enumerators were already present. The enumerators were extension officers from 11 different extension areas covering approximately 15-20 miles east-west and 10-15 miles north-south from Santa Cruz. Each area was considered a cluster for the survey.

The survey instruments were reviewed with Mr. Montague and the enumerators were trained. Each enumerator was given 10 survey instruments (consisting of consumption and post harvest handling of peanuts). Even though these were experienced enumerators, Mr. Montague was requested to monitor closely the quality of the work. The team returned to Kingston at the end of the day, as the following day was a public holiday.

May 23

This was a national holiday. In the afternoon, Dr. Singh and Dr. Jones had an opportunity to go to the beach with Mr. Daley and his family.

8.6 Meeting with Mr. Payne and Mr. Suah to Discuss Peanut CRSP Program in Detail

Drs. Jones and Singh met with Mr. Payne and Mr. Suah at the CARDI office at 9:00 a.m. on May 24. The following things were discussed: (1) The Peanut CRSP program; (2) The Peanut CRSP in CARDI; (3) The role of Alabama A&M University; (4) The role of the University of Florida; (5) Possible areas of research in Jamaica.

Mr. Payne has been working with peanuts in Jamaica for a number of years and has been advising peanut growers and also processors of peanut products. He expressed the need for research in post harvest handling of peanuts and improved packaging of peanuts in Jamaica. He has evaluated several varieties of peanuts in Jamaica; however, Valencia has been found to be the most commonly accepted variety. The problems encountered by the peanut farmers and processors are: (1) drying and curing of peanuts; (2) separation of testa; and (3) suitability of a variety for peanut butter. According to one processor, Valencia does not produce the right texture for the peanut butter. Further, there is a problem of separation of testa.

Mr. Payne collected samples from various markets in the Kingston area. It included: Unshelled peanuts (not cleaned); shelled peanuts with testa; shelled peanuts without testa; peanut brittle (a sugar coated product; peanut butter bar (peanut butter with cane sugar, corn syrup and coloring agents). Canned peanuts were not available in the market.

8.7 Meeting with Mr. Kenneth Leslie and Ms. Sallie Campbell

Mr. Suah, Dr. Jones, and Dr. Singh visited the Caribbean Food and Nutrition Institute and met Mr. Kenneth A. Leslie, Agriculture Economist and Ms. Sallie Campbell (Nutritionist) on May 24 in the afternoon. The scope of the project was explained but no commitment was made. It appeared, though, that Mr. Leslie or Ms. Campbell will be interested in the

peanut research. Mr. Suah also suggested that the Food Technology Institute has laboratory facilities and can be contacted for possible cooperation. It was his view that the plan of work and the memorandum of understanding need further clarification.

It was concluded, though, that in the Caribbean area Jamaica may be one of the possible sites of research, specially on post harvest handling and marketing of peanuts.

8.8 Survey in St. Elizabeth Area (Rural Site)

Dr. Singh and Dr. Jones left Kingston at 8:00 a.m. and arrived in Santa Cruz at 10:00 a.m. on May 25. By 11:00 a.m., all enumerators brought their questionnaires and collected samples to the Land Authority office. Each one of the questionnaires was reviewed by Dr. Singh or Dr. Jones. One set of questionnaires was returned and the enumerator was advised to provide the missing information. The major problem encountered by the several enumerators was about the income.

8.9 Additional Information Regarding Peanuts

Additional information was obtained from Mr. Montague. The St. Elizabeth area produces about 98% of the peanuts in Jamaica. In 1984, 4,600 acres were planted. Almost all farmers used the variety Valencia. The average yield per acre of peanuts is 0.5 tons. The recommended rate of peanut seeds per acre is 64 lbs. The seeds are self-produced and stored with hulls in dry condition in plastic bags. The land is prepared by tractors. Sowing of seeds is not yet mechanized. No herbicides are used for weed control. Weedings and moldings are done only once in the season. Farmers follow fertilizer recommendations. Most commonly present insects are caterpillers and borers. The planting seasons are: August-September and November and December. However, planting could be done anytime. Most

farmers sell the peanuts right after the harvest. hand and the nuts are hand picked after drying in further dried. The yield will depend on the conditions. There are three distinct peanut products the predominant soil type and the level of rainfall annual rainfall of 45" to 50", and the dominant soil Clayey loam, a red bauxite soil. This area conditions. The second area has an annual rainfall prior distribution. The dominant soil type is the brown bauxite soil. In this area rainfall is supplied and farmers are able to produce three peanut crops area has an annual rainfall of 70" - 80" per distribution throughout the year. The dominant soil clayey loam which is also a brown bauxite soil. that farmers preferred Valencia because of characteristic and it has disease resistance better Mr. Montague pointed out that peanuts are used more areas in a variety of forms such as drink, as ingredients and other staples. A recipe has been developed Drs. Jones and Singh returned to Kingston in the invited by Mr. Suah for a dinner.

Drs. Jones and Singh left Kingston at 8:30 a.m. at 8:30 p.m.

8.9 Recommendations

Dr. Singh and Dr. Jones would like to recommendations: _____

- (1) Jamaica should be considered as one of the positions on post harvest handling, processing and marketing

Harvesting is done by
the field. Nuts may be
oil type and weather
ing areas depending on

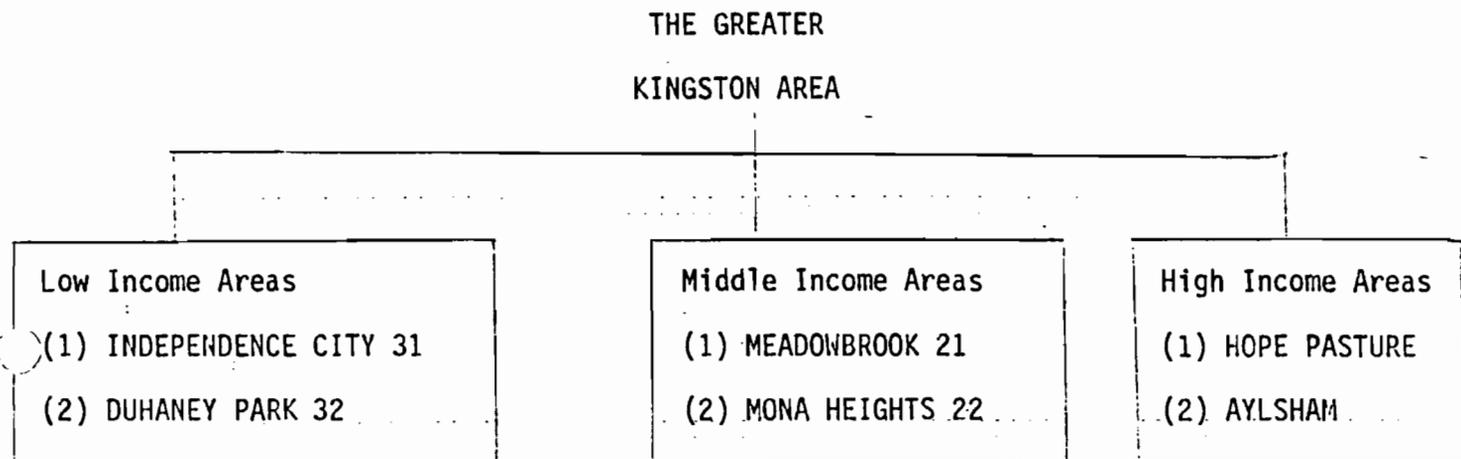
The first area has an
oil type is the St. Ann
ly experience drought
of 60" to 66" with
Newel clayey loam, a
mented with irrigation
per year. The third
year with very good
type is the Chudleigh
Mr. Montague explained
its early maturing
than other newer lines.
idely in St. Elizabeth
ients in cooking rice,
ee Attachment No. 2).
vening and were later

and arrived Huntsville

make the following

ble sites for research
ng of peanuts.

- (2) A meeting of collaborators in the Caribbean should be arranged soon to develop organization to plan future research on peanuts. All the collaborators should be made fully aware of the goals and objectives of the Peanut CRSP.



ENUMERATORS

- | | |
|--------------------|----------------------|
| (1) Andrea Reid | (5) Garnet Peterkin |
| (2) Peter Smith | (6) Michael Richards |
| (3) Wayne Bowden | (7) Adrian Rose |
| (4) Carlton Wallen | |

Figure 1. Scheme of Survey on Consumption of Peanuts in Jamaica (urban site).

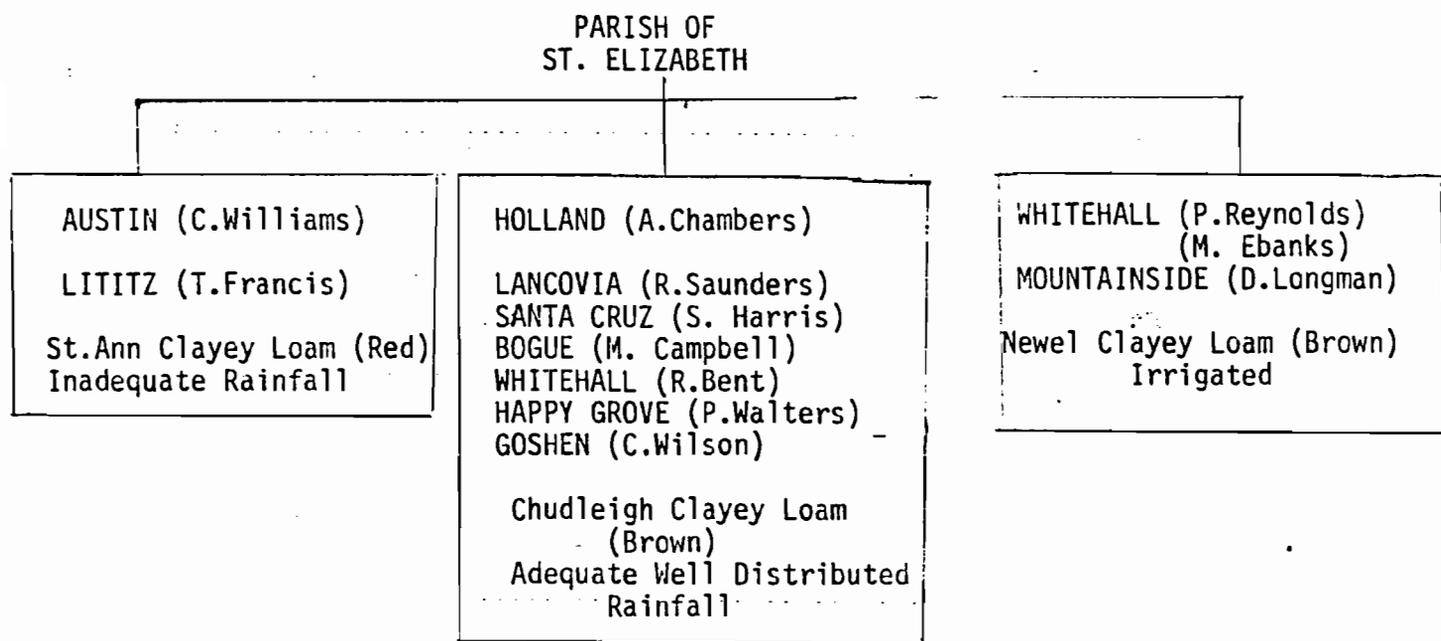


Figure 2. Scheme of Survey of Post-Harvest Handling and Consumption of Peanuts in Jamaica (rural site).

Peanut CRSP - Food Technology/Variety Trials

Trip Report

Country Visited: Jamaica

Period of Visit: January 9 - 12, 1985

Travelers: Drs. B. Onuma Okezie and David Cummins, and Bill Branch

People met During Visit:

Mr. Joseph Suah, Head, CARDI Jamaica
Mr. Horace Payne, Agronomist, CARDI Jamaica
Dr. B. K. Rai, Head, CARDI Belize
Dr. Laxman Singh, Head, CARDI Antigua
Dr. S. Parasram, Executive Director, CARDI
Mr. H. Hall, Acting Executive Director, Scientific Research Council
(SRC), GOJ
Dr. Althea Townsend, Director, FTI, Jamaica
Mrs. D. Lewis, Food Technologist, FTI, Jamaica
Mr. Correa, USAID, Jamaica

Objectives:

- (1) To formalize an agreement with the Scientific Research Council (SRC) for the involvement of the Food Technology Institute as host country counterpart in Jamaica for Food Technology component.
- (2) To work out the mechanism for the collaborative linkage with SRC/FTI through CARDI.
- (3) To meet and discuss with the scientist from Belize, the food technology needs of peanut production and utilization in Belize.

Executive Summary

Agreement was reached with the Scientific Research Council of the Ministry of Agriculture for the participation of the Food Technology Institute as a host country collaborating institution in the food technology component of the Peanut CRSP in Jamaica under CARDI as the regional collaborator. This arrangement was worked out after a three hour meeting between the Acting Executive Director of SRC, Mr. Hall, the

Director of the Food Technology Institute, Dr. Townsend, with one of his colleagues, Mrs. Luis, Dr. Cummins, Director, Peanut CRSP Management Entity; Dr. Okezie, Director, Office of International Programs, Alabama A&M University, and Mr. Correa, an observer from USAID.

In a meeting between CARDI, represented by its Executive Director Dr. Parasram, and Jamaican Unit Head Mr. Suah, the Scientific Research Council (SRC), represented by Mr. Hall, and Alabama A&M/Peanut CRSP Management Entity, represented by Dr. Okezie and Dr. Cummins, agreement was reached on the mechanism for transferring money to SRC/FTI and for fiscal accountability and reporting by SRC/FTI.

A plan of work for specific activity for 1984/85 covering January to June, 1985 with appropriate budget was developed. This became an attachment to the host country (FTI) general plan of work under the MOU with CARDI, whose provisions were accepted and endorsed by Mr. Hall.

A preliminary plan of work based on information provided by Dr. Rai covering the Food Technology needs of Belize was developed. Agreement was reached that a visit would be made to Belize within a month or so to clearly define the peanut research needs in that country.

DETAILED REPORT

January 9, 1985

Dr. Okezie left Huntsville at about 7:30 a.m. and arrived Kingston, Jamaica with Drs. Cummins and Branch, who joined him from Miami at 3:15 p.m. We were met at the airport by Mr. Horace Payne from CARDI who took us to the Courtleigh Hotel where reservations were made for us. Contact was established with Mr. Hall of the Scientific Research Council, who agreed to pick us up the following morning for our meeting with him and the FTI personnel.

January 10, 1985

Drs. David Cummins and Onuma Okezie were picked up by Mr. Hall at 9:00 a.m. to the Food Technology Institute while Mr. Payne picked up Dr. Branch for their own meeting at CARDI with cooperators from Antigua and Belize on the Variety Trials project.

Our meeting at the FTI was attended by two people from FTI, Dr. Townsend and Mrs. Luis; one person from SRC, Mr. Hall. Mr. Correa from USAID sat in as an observer. Dr. Cummins provided background information on the CRSP generally and on the Peanut CRSP in particular. He explained the basic philosophy of the program to our host country counterparts. The draft copies of a general plan of work were given to them for review and any comments or changes they might consider appropriate. An agreement was reached for Dr. Okezie to meet with the FTI the next day to develop a specified plan of work for FTI for 1985.

The meeting lasted about 3 hours, after which Drs. Cummins and Okezie were taken to the CARDI office to meet with the officials there.

After a quick lunch at the Senior Common Room at the University, Dr. Okezie held separate discussions with Dr. B. K. Rai from Belize to discern the peanut processing and post harvest handling needs of Belize. Dr. Rai indicated that Belize has surplus peanuts, having increased peanut production about 1,500 lb/acre on a 600 acre/year. The main variety at present is Tennessee Red, which they have tried to use for peanut butter processing, but are having some difficulties with the processing.

A peanut butter factory has been established. Production in the factory is a batch operation involving the use of a decorticator, a roaster, a blancher, a micromizer, and bottle filling equipment. Dr.

Rai indicated that their main problem with the processing is that there is oil separation in the peanut butter made in the factory. There is an urgent need to visit their factory to identify what might be causing the problem, and to assist in solving it. Other areas of suggested product outlet for their surplus peanut is in making of salted or dry roasted peanuts with coatings, or with spices, or peanut candies.

January 11, 1985

Drs. Cummins and Okezie were picked up at 8:30 a.m. by Dr. Townsend to work with her in defining some specific activities for their involvement for the period January to June, 1985, and to set up a budget for such activities. A plan of work with specific objectives and the approaches for accomplishing those objectives was developed. It was clear that the first priority was the peanut butter processing improvement being done at the Frozen Foods Plant, followed by using information from the peanut consumption survey or any additional/supplementary survey to determine any appropriate improvements in existing peanut products. Another objective would be new product development geared to addressing school lunch program needs, weaning foods needs, and in the area of peanut drink and dry soup mixes that would be acceptable to the people.

During the afternoon, Dr. Parasram and Mr. Hall were brought together at the CARDI office to discuss and/or set up the mechanism for the collaboration as it would affect their organizations and agree on the procedure for communication on the project. Money to cover FTI's activities, based on each year's scope of work and budget, will be provided by AAMU through CARDI. Accounting by SRC/FTI would be submitted through CARDI to AAMU quarterly or as many times as

reimbursements of expenses may be needed, with appropriate expense vouchers, but not more than monthly. The signing of the Plan of Work-Host Country under the MOU was conducted and each representative (CARDI and SRC) was provided with a copy of the MOU after it had been endorsed by Mr. Hall.

Dr. Okezie held another discussion with Dr. Rai from Belize concerning peanut post harvest research needs in Belize. It was pointed out that, due to high humidity conditions in Belize, and in view of the surpluses of peanuts in the country, major attention should be paid to the aflatoxin problem immediately. Among the possible post harvest handling investigations to be conducted in cooperation with the scientists on the Variety Trial component would be

- (1) Peanut storage under different humidity and temperature conditions.
- (2) Peanut curing in the field under sunshine/dry and rainfall conditions.
- (3) Comparative studies with the thin vs thick shell varieties (recently introduced from ICRISAT) and their susceptibility to aflatoxin contamination and moisture pickup and storageability.
- (4) Thick vs thin shell of small, medium, and large size grain viability under varying conditions of temperature and humidity.
- (5) Assessment of different varieties being screened for suitability for confectionary/snack application and/or for peanut butter processing and for consumer acceptability.
- (6) Chemical assay for
 - (a) Aflatoxin levels at different stages of production and storage;
 - (b) Proximate composition in new varieties;

(c) Fatty acids in new varieties.

The final activity was a visit to the USAID to brief them on the outcome of the meetings. We met with Mr. Correa, who informed us that he had submitted a copy of the MOU to his supervisors and recommended the endorsement of the MOU, as was already provided in the MOU. He also assured us of the Mission's interest in the program and willingness to assist in facilitating communication between us and the host country counterparts.

January 12, 1985

Our plane from Kingston departed on time at about 7:30 a.m. Drs. Cummins and Okezie arrived in Atlanta at about 12:15 p.m. and Dr. Okezie finally reached Huntsville at about 2:00 p.m.

**Report of Travel Regarding the Project Entitled:
Peanut Utilization in Food Systems in Developing Countries
(AAM-FL/FT/CARDI)**

Jamaica and Trinidad

Dr. B. Singh, Food Scientist, Professor

**Dr. B. Onuma Okezie, Food Scientist, Director
Office of International Programs**

Alabama A & M University, Normal, AL 35762

**An Activity Report from Peanut CRSP
International Programs, Alabama A&M University
Normal, Alabama 35762**

Supported by Grant USAID/DSN N-G-0247

1.0 Purpose of Travel

1. To meet administrators and collaborators at Food Technology Institute, Kingston, Jamaica, and discuss plan of research and establish formal linkage to conduct research on food technology aspect of peanut under the Peanut CRSP guidelines.
2. To meet administrators and collaborators at the University of West Indies and CARDI, St. Augustine and discuss plan of research and establish formal linkage to conduct research on post-harvest and food product development aspects of peanut under the Peanut CRSP guidelines.

EXECUTIVE SUMMARY

- 2.0 The objectives of this trip, as outlined in the preceding section, were accomplished. Dr. Onuma Okezie, Director of International Programs and Dr. B. Singh, Food Scientist from Alabama A&M University, Dr. S. A. Ahmed, Food Scientist from the University of Florida, and Dr. David G. Cummins, Peanut CRSP Director travelled to Kingston, Jamaica and St. Augustine, Trinidad to meet with administrators and scientists at Food Technology Institute, CARDI, and University of West Indies from December 10 to December 15, 1984. In Kingston, the teams met with USAID personnel and staff of CARDI and Food Technology Institute. The objectives of the research were discussed with members of the Food Technology Institute. The Director of the Food Technology Institute was not available for discussion; however, Mrs. Doreen Lewis expressed her willingness to participate in the Peanut CRSP research. The team visited the facilities at the Institute. It was generally agreed

that a second visit will be made soon to formalize the agreement through a memorandum of understanding (MOU). The team also visited CARDI and food processing facilities in Kingston. It was apparent that research is needed on improvement of processing of peanuts in Jamaica. At present, Jamaica does not have a program on quality assurance on peanut processing.

The team visited St. Augustine and met with the administrators and scientists at the University of West Indies. A formal agreement of cooperation was signed. Dr. George Sammy, Food Technologist at the University of West Indies, agreed to serve as the project Director. The research plan will include problems in post-harvest handling, storage and processing of peanuts in Trinidad and East Caribbean nations. Later, the team met with the Director of research at CARDI. It was agreed that CARDI will coordinate the research on post-harvest handling, storage, and processing of peanuts in Jamaica, Belize, and other adjoining islands. The CARDI will have an agreement with the Food Technology Institute to conduct research on processing and product development.

3.0 Itinerary

Dec. 10 Drs. Singh and Okezie left Huntsville at 6:40 a.m. and met Dr. Cummins in Atlanta. The team met Dr. Ahmed in Miami and left for Kingscton, Jamaica at 1:20 p.m. and arrived at 2:56 p.m.

The team met and discussed plan of research in the hotel in the evening.

Dec. 11 Mr. Jaime Correa, USAID, Jamaica met the team in the morning in the hotel and drove to USAID Mission office.

The team met with Mr. W. McCloskey, Agriculture Development Officer.

The team met with Mr. Horace Payne at CARDI and then Mrs. Doreen Lewis and Frances Brown at the Food Technology Institute.

Visited peanut processing at Jamaica Frozen Foods, Ltd.

Drs. Cummins and Singh visited Mr. Payne's variety testing plots at CARDI

- Dec. 12 Met with Jaime Correa and William McCloskey and Vivian Rochester at the USAID Mission. Met Mr. Vernon Morris at Jamaica Conference Center. Left for Trinidad at 2:00 p.m. and arrived at 8:15 p.m.
- Dec. 13 Visited Drs. Parasram, Forde, and Haque at CARDI and Dr. George Sammy at University of West Indies.
- Dec. 14 Visited Dr. Sammy and Mrs. Johnson to finalize agreement.
- Dec. 15 Left for Huntsville through Miami and Atlanta. Arrived Huntsville at 9:00 p.m.

4.0 Acknowledgments

The team members would like to express their thanks to Mr. Jaime Correa of USAID Mission in Jamaica and Mr. Horace Payne of CARDI, Kingston, Jamaica for their assistance during our visit. We are also thankful to Dr. S. Parasram, Director of CARDI and Dr. St. Clair Forde, Director of Research, CARDI, St. Augustine, and Dr. George Sammy of the University of West Indies for their excellent cooperation during our visit to Trinidad. The hospitality of Dr. S. Haque is greatly appreciated by Drs. Singh and Ahmed.

5.0 Arrival at Kingscton, Jamaica

The team arrived Kingston on December 10 and checked into the Courtleigh Hotel. The team members discussed details of the project in Caribbean countries. The discussion also clarified the

role of the University of Florida. It was generally agreed that the project should include problems related to post-harvest handling, storage, and quality-evaluation for processing of peanuts, along with the research on product development. Alabama A&M University should work on the post-harvest aspect while the University of Florida will work on the product development aspect of the peanut. Dr. S. Ahmed was advised to present justification for the purchase of equipment costing \$15,000 and he was further advised not to purchase any equipment costing more than \$1,000 without prior approval from Alabama A&M University in the future.

5.1 Meeting with Jaime Correa at USAID Mission

On December 11, the team met Mr. Jaime Correa at the USAID Mission. Dr. Cummins briefed him about the objectives of the Peanut CRSP. Drs. Singh and Okezie explained to him the purpose of our trip to Jamaica. Mr. Correa had already contacted Food Technology Institute (FTI) and he also indicated that the FTI will very much like to participate in research. He did not see any special problem in dealing with the FTI. Later, the team met Mr. William McClosky, Agriculture Development officer. Mr. McCloskey expressed his full support for the project.

5.3 Meeting with Mr. Horace Payne

The team met Mr. Horace Payne, Agronomist, at his CARDI office. Mr. Payne explained that Jamaica needs assistance in research on post-harvest handling and storage and product development of peanuts. There are problems and processors are not getting enough amounts of peanuts to satisfy the needs of the local

population. Further, acreage of peanuts has increased; however, there is a need for improvement of storage of peanuts.

5.4 Meeting with Mr. Vivian Rochester

We met Mr. Rochester at the USAID Mission. He pointed out that the major problems in peanuts in Jamaica is aflatoxin. Further, there is no control, so often peanuts have high moisture when it is received at the processing plant. The local variety is very expensive for processors.

5.5 Visit to Food Technology Institute (FTI)

The team members accompanied by Mr. Horace Payne and Jaime Correa visited FTI and met with Ms. Doreen Lewis and Ms. Frances Brown. Ms. Lewis outlined the ongoing research activities at the FTI which include research and development of sauce, fruit cocktail, jams, and jellies, tomato sauce, relish, breakfast cereals, and banana. FTI has not worked with peanut or peanut products; however, they expressed interest in the research. Dr. Singh outlined the objectives of the research on peanuts. Dr. Okezie clarified the role of Alabama A&M and the University of Florida and the mode of possible collaboration with the FTI. Ms. Lewis indicated that the FTI would like to work with the CRSP; however, the commitment has to be made by the Director of the Institute. She also expressed interest in getting training to do the research on peanuts. The team member after the tour of the facilities concluded that the FTI may require several pieces of equipment to conduct the research on peanuts. Mrs. Lewis pointed out that the Scientific Research Council (SRC) has facilities to

determine proximate compositions and other analyses. FTI is an agency of the SRC. Attempts were made to meet with Dr. A. Hall, Director of the SRC. However, he was busy. He was contacted by phone. He expressed interest in the project and indicated that it will help Jamaica to have research on peanut and peanut products. He will support the project.

5.6 Visit to Jamaica Frozen Food Company

Later in the afternoon of December 11, we visited Jamaica Foods Ltd. and met with Mr. Selvin L. Campbell, Managing Director. The company processes peanuts into peanut butter. He outlined the problems and needs of research on peanuts. He also indicated that the research is urgently needed on quality of peanuts for processing. The company encounters shriveled nuts, nuts with high moisture, and aflatoxin contaminated nuts. Jamaica produces only valencia peanuts, which is a small sized peanut. The team members visited the processing plant where peanut butter is produced using batch processing. The final product hardens in the jar and quality is not quite acceptable to consumers. The team members observed that the plant does not have a quality assurance program, either in acquisition of raw products or in packaging of final products.

5.7 Visit to CARDI

Mr. Payne, Dr. Cummins, and Dr. Singh visited Mr. Payne's variety trial project at CARDI. Mr. Payne was very enthusiastic about the research on peanuts and he wants to see that peanut receives the attention of the governmental and international

agencies. Later, we were guests at Mr. Payne's residence in Kingston and met his wife and his son.

5.8 Visit to USAID

On December 12, we visited USAID again and attempted to contact Dr. Hall of SRC. Dr. Hall was busy with other programs and could not be available for a meeting. Mr. Payne visited the team at the USAID Mission.

5.9 Visit to Mr. Vernon Morris of Agro-21

Agro 21 is an organization created to involve all the agricultural interests in Jamaica to put agriculture on a firm commercial basis. This is supported by the government and provides an advisory role. The team members visited Mr. Morris, Manager, Agro-business of the Agro 21. Mr. Morris expressed great interest in our project and suggested that the Peanut CRSP should keep the organization informed about its activities in Jamaica. Due to the time constraint, the team could not deliberate fully with Mr. Morris; however, it was realized that the meeting was meaningful.

6.0 Arrival in Trinidad

The team left Jamaica for Trinidad in the afternoon and arrived at Port of Spain in the evening. The team members checked into the Monastery in St. Augustine.

6.1 Visit to CARDI

On December 13, the team visited CARDI. Dr. St. Clair Forde, Director of Research received the team. He pointed out the changes at CARDI. Dr. S. Haque further discussed the work on variety trials. Dr. Parasram met with the team and he expressed the

willingness to continue work on the project. He indicated that the work in Jamaica at FTI and post-harvest aspect could be handled administratively through the CARDI office. Drs. Cummins and Okezie visited Mrs. Johnson of UWI while Drs. Singh and Ahmed waited with Dr. S. Haque at CARDI.

6.2 Visit to University of West Indies (UWI)

Later on December 13, the team visited Dr. George Sammy in his office. Dr. Singh outlined the work on the project which will include post-harvest handling and storage, product improvement (peanut butter, milk, confectionery or any indigenous product); new product development (suitable for local consumers) and training of personnel. Dr. Sammy expressed his willingness to collaborate and advised us to meet with Mrs. Johnson in the business office to finalize the contract.

The team members worked on the budget and the work plan for UWI and proposed to meet with Mrs. Johnson in the morning to sign the MOU.

6.3 Visit with Mrs. Johnson

The team members and Dr. Sammy met in Mrs. Johnson's office on December 14. Dr. Sammy reviewed the work plan and agreed that the UWI will take the responsibility to do research according to the plan in Trinidad and the east Caribbean nations. Mrs. Johnson agreed to sign the MOU. However, due to the Christmas party, she promised that she will send the signed document to Dr. Cummins. Also, the document needed the signature of the Vice President of Research at the University of Georgia and the President at Alabama

A&M University. Dr. Cummins suggested that he will send the finally prepared copies to sign soon after he returns home.

Drs. Cummins and Okezie left for Barbados while Drs. Ahmed and Singh stayed in Trinidad and returned home on December 15. Dr. Singh also visited Mr. Walmsley to get the records of expenses on the survey and Mrs. Sanches to collect the survey questionnaire on consumption. Drs. Ahmed and Singh left in the morning of December 15 and met Drs. Cummins and Okezie in Barbados. Drs. Singh and Okezie arrived Huntsville later in the evening (about 9:00 p.m.).

7.0 Accomplishments and Conclusions

- (1) The ground work for research in Jamaica at Food Technology Institute (FTI) and CARDI was developed. The FTI will conduct research on product improvement or new product development with assistance from the University of Florida/Alabama A&M University.
- (2) The work on post-harvest handling and storage in Jamaica and east Caribbean nations will be coordinated through CARDI.
- (3) The University of West Indies will have a separate work plan and a budget on post-harvest handling and storage and product development for Trinidad and east Caribbean nations. Dr. George Sammy will coordinate the project at the UWI.

REPORT OF TRAVEL REGARDING THE PROJECT ENTITLED:
PEANUT UTILIZATION IN FOOD SYSTEMS IN DEVELOPING COUNTRIES
(AAMU-FL/FT/CARDI)

TO
TRINIDAD, ST. VINCENT, BARBADOS, JAMAICA
MAY 15 - 26, 1984

BY
Dr. B. Onuma Okezie, Food Scientist
Dr. Virginia Caples, Home Economist
Dr. G. C. Wheelock, Rural Sociologist
Dr. Hezekiah Jones, Agricultural Economist
Dr. Bharat Singh, Food Scientist

ALABAMA A & M UNIVERSITY, NORMAL, ALABAMA 35762

AN ACTIVITY REPORT FROM PEANUT CRSP
INTERNATIONAL PROGRAMS, ALABAMA A & M UNIVERSITY
SUPPORTED BY GRANT USAID/DSN N-G-0247

TABLE OF CONTENTS

- 1.0 Purpose of Travel
- 2.0 Executive Summary
- 3.0 Itinerary
- 4.0 Acknowledgment
- 5.0 Arrival at CARDI offices at the University of West Indies, St. Augustine, Trinidad; Activities in Trinidad: B. O. Okezie, V. Caples, G. C. Wheelock
 - 5.1 Briefing on Survey Plan by Dr. Walmsley and CARDI Staff
 - 5.2 Training of Enumerators: Sampling and Interview Questionnaires
 - 5.3 Editing and Coding on Completed Questionnaires
 - 5.4 UWI Computer Centre Assistance
 - 5.5 Preliminary Survey Report
 - 5.6 Meeting with Dr. George Sammy Regarding Peanut Product Development and Survey Findings
- 6.0 Activities in St. Vincent: B. O. Okezie and V. Caples
 - 6.1 Arrival in St. Vincent: Meeting with Mr. C. Bishop
 - 6.2 Organization of the Survey
 - 6.3 Editing and Reviewing of the Completed Questionnaires
 - 6.4 Meeting with Mr. G. R. Vanluo, Chief Agricultural Officer, and Mr. Kenneth Bonadie, Deputy Agricultural Officer
- 7.0 Activities in Barbados
 - 7.1 Meeting with Mr. Don Harrington, Assistant Agricultural Development Officer and Mr. Steven Szadek, Acting Agricultural Development Officer.
- 8.0 Activities in Jamaica: B. Singh and H. Jones
 - 8.1 Meeting with Mr. Horace Payne and Mr. Joseph R. R. Suah
 - 8.2 Organization of the Survey in Kingston
 - 8.3 Training of Enumerators
 - 8.4 Editing and Rechecking of the Completed Survey Questionnaires
 - 8.5 Survey Plan for Rural Area

- 8.6 Meeting with Mr. Suah and Mr. Payne to Discuss CRSP Programs in Detail
- 8.7 Meeting with Mr. Kenneth Leslie (Agricultural Economist) and Sallie Campbell (Nutritionist).
- 8.8 Organization of Survey in St. Elizabeth Area (Rural Site)
- 8.9 Recommendations

1.0 Purpose of Travel

1. To conduct a peanut product consumption survey in St. Augustine, Trinidad (an urban site) for the purpose of planning future collaborative research on peanut product improvement or new product development and utilization.
2. To conduct peanut consumption and post harvest surveys in Kingstown, St. Vincent (in urban and rural areas) for the purpose of planning future collaborative research on peanut product improvement or new product development and utilization.
3. To conduct peanut consumption and post harvest surveys in Jamaica (in urban and rural sites) for the purpose of planning future collaborative research on peanut product improvement or new product development and utilization.

Executive Summary

The objectives of this trip as outlined in the preceeding section were accomplished. Drs. Onuma Okezie and Virginia Caples supervised the completion of the survey in an urban site, Kingstown, and rural site near Kingstown in St. Vincent Island. Kingstown, St. Vincent was divided into 11 (eleven) clusters and rural peanut producing areas into 8 (eight) clusters. The completed questionnaires, 424 for consumption and 210 for post-harvest handling of peanuts and peanut product samples were brought by the team to Alabama A&M for analysis and interpretation. The survey in St. Augustine, Trinidad was supervised by Dr. G. C. Wheelock. In addition to completion of the survey, Dr. Wheelock with host country counterparts also completed editing, coding, and processing of the survey data from Trinidad. A plan for collaborative research in Trinidad has also been discussed. Dr. Singh and Dr. Jones, with excellent collaboration with Mr. Horace Payne and

Mr. Joseph Suah of CARDI, completed consumption survey in 8 (eight) different zones of the City of Kingston (Jamaica) and 11 extension areas in St. Elizabeth Parish in Jamaica. St. Elizabeth Parish represents peanut producing areas of Jamaica. The personal observations indicate that Jamaica produces a significant amount of peanuts in the Caribbean region. In urban areas peanuts are consumed by almost everyone; however, the cost and availability of peanuts and peanut products are prime reasons for less utilization of peanuts. It was further noted that there is sufficient interest in CARDI staff members in Jamaica to continue research on post-harvest handling, including storage and processing of peanuts in Jamaica. It also seems possible to receive cooperation from the Ministry of Agriculture, Food Nutrition Institute and Food Technology Institute.

3.0 Itinerary: Dr. Wheelock

- May 15 The AAMU Peanut CRSP survey team - Drs. Caples and Okezie (St. Vincent), Wheelock (Trinidad), Jones and Singh (Jamaica) left Huntsville at 7:00 a.m. The team split in Miami for Trinidad and Jamaica destinations. Caples, Okezie, and Wheelock arrived in Trinidad at about 6:30 p.m. where they were met by Dr. Walmsley.
- May 16 Reviewed survey plans with Trinidad CARDI staff - Dr. Walmsley, Joan Sanchez (survey statistician), and Merl Boodoo (research assistant). Met eleven enumerators and conducted training on sampling and interviewing procedures.
- May 17 Edited and coded the first two questionnaires for each of nine enumerators. Assigned four additional sample households for each enumerator.
- May 18 Met with CARDI statistician Brian Luckner and UWI computing center staff. Mrs. Sanchez arranged to start key punching the data Monday, May 21 on a daily basis.

Dr. Okezie and Dr. Caples

- May 16 Dr. Caples and Dr. Okezie and Mr. Walmsley (CARDI) left for St. Vincent and arrived in Kingstown.
- May 17 Meeting with Mr. C. Bishop
- May 18-20 Planning of Survey and Training of Enumerators

- May 21-22 Editing of Completed Questionnaires
- May 23 Meeting with Mr. G. R. Vanluc, Chief Agricultural Officer and Mr. Kenneth Bonadie, Deputy Agricultural Officer
- May 24 Dr. Caples left for Huntsville, AL
Dr. Okezie left for Barbados
- May 25 Meeting with Mr. Don Harrington, Assistant Agricultural Development Officer and Mr. Steven Szadek, Acting Agricultural and Rural Development Officer
- May 26 Dr. Okezie left for Huntsville

Dr. Singh and Dr. Jones

- May 15 Arrived Kingston, Jamaica at 1:55 p.m.
- May 16 Meeting with Mr. Horace Payne and Mr. Joseph Suah of CARDI
- May 17 Meeting with Mr. Payne and Mr. Suah and planning of survey and training of enumerators
- May 18-20 Completion of Survey in Kingston
- May 21 Planning survey in rural area with Mr. Payne
- May 22 Trip to Santa Cruz
- May 23 National Holiday; however, survey continued
- May 24 Meeting with Mr. Suah and Mr. Payne to outline future research on peanut utilization in Jamaica
- May 25 Travel to Santa Cruz to collect completed questionnaires and complete editing
- May 26 Dr. Singh and Dr. Jones left Kingston for Huntsville
- May 21-24 Completed enumeration and coding of 180 peanut utilization household interview schedules.
- May 25 In spite of power failure the entire morning, all data were key punched and a listing of all data and frequency distributions were completed by 6:30 p.m. In the evening, accompanied by Selby Alfred, Wheelock visited Dr. George Sammy and discussed the survey and project plans. He expressed an interest in coming to the peanut meeting this summer, as suggested to him by Dr. Cummins.
- May 26 Departed Trinidad at 7:00 a.m. and arrived Huntsville at 8:00 p.m.

4.0 Acknowledgement

Prior arrangements made in Trinidad by CARDI Peanut CRSP coordinator, Walmsley with Mrs. Joan Sanchez, CARDI survey statistician and Miss Merl Boodoo, Research Assistant, to assist with the survey were excellent. Mrs. Sanchez provided excellent coordination with enumerators and with the UWI computing center and Miss Boodoo had provided census enumeration maps and had randomly sampled households from the entire survey area. She also provided excellent assistance in supervising enumerators and in editing and coding the completed survey instruments. Dr. Sinclair Ford, Dr. Osuji and other CARDI staff made the survey team feel at home and provided an excellent working environment. The cooperation of nine survey enumerators - Stancia Cornwall, Kathleen Rose, Camille Antoine, Alfred Francis, Selby Alfred, Carmichael Khan, Joseph Barbaste, Dave Miller, and Paul Badre Singh - was especially appreciated. The hospitality and discussions with Dr. George Sammy and other food technologists were also appreciated by Dr. G. C. Wheelock.

The team members thank the CARDI staff in St. Vincent and Mr. C. Bishop from St. Vincent for their cooperation and assistance throughout the survey, and Mr. G. R. Vanluo and Kenneth Bonadie for providing useful information on peanut production and utilization in St. Vincent. Dr. Okezie thanks Mr. Harrington and Mr. Szadek of the USAID Mission for their interest in the project.

Dr. Singh and Dr. Jones are thankful to Mr. Joseph Suah and Mr. Horace Payne of CARDI, Jamaica for their hospitality and excellent cooperation.

5.0 Arrival at University of West Indies, St. Augustine, Trinidad

Drs. Wheelock, Okezie, and Caples departed Huntsville, AL at 7:00 p.m. and arrived in Port of Spain at 7:00 p.m. They were met by Dr. Walmsley, CARDI agronomist and collaborator on the project. They proceeded to the Senior Commons Room near the UWI campus where rooms had been reserved and where they met Dr. Curtis McIntosh, Food Economist, UWI, and Dr. P. Osuji, CARDI scientist.

5.1 Briefing on Survey Plan by Dr. Walmsley and CARDI Staff

Wednesday morning the AAMU team, Drs. Wheelock, Caples and Okezie, met with the CARDI team coordinator, Dr. Walmsley, Joan Sanchez, and Merl Boodoo. Sampling plans were discussed. Census enumeration maps of the proposed survey areas - Tunapuna, St. Augustine, and Cuepeo had been secured and households had been randomly selected (6 households from each of 55 maps)! The entire area within easy access of the University is known to be closely representative of Trinidad population in general. The samples from the 55 maps were divided into three approximate income strata - high, medium, and low. It was decided to monitor the survey returns daily to be sure that all income strata would be represented with at least 30 to 50 households.

Dr. Okezie visited Mrs. Johnson of the Bursar's Office, University of the West Indies, St. Augustine, to determine the status of a modified version of the MOU with CARDI that will provide for the UWI's participation in the CRSP independent of CARDI. This arrangement was begun by Dr. Cummins during his visit to Trinidad in April. It was indicated that they were still working on the document left behind

by Dr. Cummins and that as soon as all the appropriate people, including Dr. Sammy, who needed to review it had done so, they would return it to Dr. Cummins.

5.2 Training of Enumerators: Sampling and Interview Questionnaires

Eleven potential enumerators met with the team Wednesday afternoon. Training in both sampling procedure (map reading) and administering the survey instrument was conducted. At the conclusion of a two hour session each enumerator was assigned two households on one map to be completed by the following morning. Nine of the eleven enumerators returned with the completed schedules, but two decided not to participate. Wheelock and Boodoo went over the returned schedules with each enumerator correcting data collection procedures and editing any unclear responses. This procedure was repeated with four additional households for each enumerator on the second day. By Monday, all enumerators had completed six households and three had completed 12. The supervisors had also edited all completed schedules in conference with each enumerator. The map locations of the households interviewed were also verified. In case the households were not at home, enumerators were instructed to return to the specified households until either the male or female head could be interviewed. Only in case of vacancies, the household to the left of the sample household was to be questioned.

5.3 Editing and Coding Of Completed Interview Questionnaires

Editing of completed survey schedules was done in conference with each enumerator as described above. Based on the first 50 returns, the coding procedure was fully developed by Tuesday. The codes are

attached. From this point on, coding was incorporated into the editing process. Three of the enumerators were subsequently trained to transfer the coded data from schedules to transfer sheets.

5.4 UWI Computing Center Assistance

Mrs. Sanchez and Brian Luckner, CARDI statisticians, provided entry into the computing center. Wheelock transferred the coded schedule into SPSS code and Mrs. Sanchez assembled the data files and computer runs each day. The first page of the schedule included data necessary to monitor sample representativeness and enumerator records. This subset of variables was processed daily. The entire set of 180 schedules was key punched and a computer printout of over 100 variables was run by Friday, May 25 at 6:30 p.m. A complete data file is now available at CARDI for analysis, as well as at AAMU. Computing Center personnel were extremely helpful throughout the work.

5.5 Preliminary Survey Report

SPSS printouts of the frequencies are available at AAMU and CARDI. Interpretation and analysis will be developed at AAMU and CARDI (Table 1). Initially, further analysis will be done at AAMU and it is being requested that someone at CARDI or UWI be identified to collaborate. Mrs. Sanchez's further assistance will be invaluable in this regard.

5.6 Meeting with Dr. George Sammy Regarding Peanut Product Development and Survey Findings and Additional Information

After leaving the Computing Center, Wheelock accompanied by Selby Alfred, one of the enumerators and an agricultural engineering

graduate, visited Dr. George Sammy at his residence. Dr. Sammy had expected to hear from the University of Florida investigator on the project. He is expecting additional information on the peanut meetings this summer. He is also processing a memorandum of understanding with the Peanut CRSP through the UWI bursars office. He views peanut product development as a long range objective that would appropriately follow improvements in local productivity and profitable markets. In the meantime, home production and processing may be enhanced. He was not convinced that this process required "research". Peanut drinks, for example, have been researched and are now a matter of variations in formulation, testing, and marketing. A newspaper article which appeared in Trinidad newspapers during the survey emphasized home production and processing. (See Attachment 1).

The survey results will certainly confirm that home processing of peanuts - fried, roasted, or homemade peanut punch from milk and peanut butter (often facilitated with the use of an electric blender) is very important in the domestic diet. While gardening is gaining some popularity, very little, if any, peanut production is reported in the survey. The poorer households in the sample, however, often report lack of garden space.

Roasted peanuts and peanut butter are ubiquitous in stores throughout Trinidad. Like all food prices in Trinidad, peanut products are expensive. Household food expenditure surveys conducted at UWI and CARDI have found middle and low income families spend 2/3 or more of their income on food. Peanut products like most foods, depending upon the exchange rate used, were more expensive than in the U.S. One pound of peanut butter costs 9.50 TT\$ or \$4.00 US at the

official exchange rate. Even at commercial exchange rates, consumers were paying the equivalent of \$3 U.S. per pound of peanut butter. Roasted peanut prices are equally high. Nevertheless, economic studies show that it is cheaper to import the raw peanuts than to grow them domestically.

6.0 Activities in St. Vincent: B. O. Okezie and Virginia Caples

On May 16 Drs. Caples, Okezie, and Walmsley left for St. Vincent.

6.1 Meeting with Mr. C. Bishop

Contact was established with Mr. C. Bishop, the project contact in St. Vincent, by Dr. Walmsley who travelled with the team to St. Vincent.

6.2 Organization of the Survey

Mr. Bishop spent most of the morning hours in contacting the enumerators that he had organized. These were brought together that afternoon for training. There were about twenty enumerators who were trained. Eleven of these were assigned to the peanut consumption survey in the urban (Kingstown) area and the other nine were assigned to the rural areas. Each enumerator was assigned to a predetermined section of the urban area whereas each rural area enumerator was assigned to survey an already randomly selected list of farmers for the consumption and post harvest surveys. Each of the enumerators was assigned an area and given two consumption questionnaires for the urban, and two consumption and two post harvest questionnaires for the rural area for trial with real respondents. They were scheduled to come back the next day for a review of their performance with the survey questionnaires and to work out any problems that they might have experienced in administering the questionnaires. At the end of that review session, more questionnaires were issued to each of the enumerators for full scale survey of their respective areas.

Editing and Reviewing of the Survey

On May 18, appointments were set up for each of the enumerators for the review of their trial survey instruments. At the end of each enumerator's review, sufficient questionnaires for an area were issued to

those who did not have much difficulty in their trial survey. For those who still appeared to have problems, fewer forms were issued to them and they were required to come back for review of those questionnaires after completion. This routine was to ensure more accuracy in enumeration and to avoid having to ask an enumerator to go back for more information or better clarifications on ambiguous answers over large numbers of respondents.

For the rural enumerators a central place, a sort of rendezvous, was identified and times set up for them to meet the supervisory team there. Two enumerators could not meet the team on Saturday because they are Seventh Day Adventists. The supervisory team had to go to their home on Sunday to review their trial surveys and to issue them with new questionnaires.

During the period May 21 - 24, the enumerators came back with their finished questionnaires for review. Those that were improperly filled or those that contained ambiguous information were returned to the enumerators who were required to go back to the respective respondents for necessary clarifications or completion. Many times these reviews continued very late at night.

6.4 Meeting with Mr. G. R. Vanluo, Chief Agricultural Officer and Mr. Kenneth Bonadie, Deputy Agricultural Officer

On Wednesday, May 23 Dr. Okezie and Dr. Caples met with officials of the Ministry of Agriculture, Messrs. G. R. Vanluo, Chief Agricultural Officer, and his Deputy, Kenneth Bonadie. The purpose of the meeting was to brief them on the activities related to the Peanut CRSP in the region and to find out what, if any, their agricultural programs (present and future) were, particularly as they relate to peanut production and utilization. A five year development plan was said to be envisioned in which they hope to

increase the area of peanut production from the present 100 acres to 300 acres. They said that they were in the process of signing a bilateral agreement with the USAID (this was later confirmed during a meeting with Dr. Okezie and USAID Mission officials, Messrs. Harrington and Szadek in Barbados during his exit briefing visit). Among the problems of peanut production in St. Vincent as seen by the Ministry is marketing. At the moment, they only sell to Guyana. Other CARICOM countries obtain cheaper peanuts from the U.S.A. So, the St. Vincent Marketing Board, which is the major if not the only buyer from the farmer, is often stuck with the produce that it could not sell to that one market.

After explaining various aspects of the Peanut CRSP to them, the team wanted to know what level of trained manpower that the ministry might have which could be made available for participation in the project under the umbrella of CARDI, which is the official host country collaborator. Such trained manpower in the food area did not seem to exist. However, they expressed deep interest in involvement and pledged to cooperate with CARDI in whatever was needed to be done in their country. They also indicated interest in training their people in this area. They requested a copy of the project objectives, which we arranged and provided to them the following day. During the discussion that ensued after glancing through the document, Mr. Bonadie, who was asked to meet with the U.S. team, indicated that many of the objectives of the project were in agreement with their project plan objectives and interest. However, they would study the document and send their response to AAMU on how they hope to cooperate with us on the project.

Dr. Caples departed on Thursday morning to return to the U.S. The last enumerator submitted his papers at about 2:45 p.m. Dr. Don

Walmsley, who had travelled with the team from Trinidad and helped to make the organizational arrangements before our arrival, left at 5:00 p.m. for another assignment in St. Lucia. Dr. Okezie tidied up the rest of the activities with the assistance of Mr. Clive Bishop who was the St. Vincent contact person on the project. Mr. Bishop worked very hard in organizing or identifying the farmers who had to be surveyed, and in selecting the enumerators, all of whom did an excellent job.

Last Day in St. Vincent

Dr. Okezie and Mr. Bishop visited Mrs. Adeline John, a homemaker who was recommended as the foremost lady in formulated traditional foods and baked products. Useful discussions were held on the various local foods in which peanuts are or could be used. She provided the team with a recipe for the preparation of peanut sugar cake. This recipe is reproduced below.

Dr. Okezie left for Barbados at about 8:30 p.m. on Thursday, May 24.

7.0 Activities in Barbados: B. O. Okezie

Dr. Okezie met with USAID Mission representatives Mr. Don Harrington, Assistant Agricultural Development Officer and Mr. Steven Szadek, Acting Agriculture and Rural Development Officer at about 10:20 a.m. He briefed them on the status of the Peanut CRSP in the region, particularly as it related to the consumption and post harvest surveys. They expressed interest in getting information on the results whenever they are ready. They also confirmed the plan to sign a bilateral agreement with the government of St. Vincent any time from now. The agreement will center on four major crops - peanuts, onions, sweet potatoes, and carrots. It will deal with improvement in production and the introduction of cultivators. The MOA and CARDI, working through the Organization for Rural Development (ORD) will be involved in the project. This was a very useful meeting, as

it provided the opportunity to learn of some of the USAID objectives in the region. The meeting lasted for about 1½ hours.

On May 26, Dr. Okezie departed from Barbados at about 9:00 a.m. and arrived Huntsville at about 8:25 p.m. with completed questionnaires and peanut samples.

8.2 Organization of the Survey in Jamaica

On May 17, Drs. Singh and Jones arrived at 8:00 a.m. in the CARDI office and discussed the areas to be included in the survey. Based on the advice of the town planners, the greater Kingston area was delineated in zones representing high, middle, low income areas. Each zone was considered a cluster, and the clusters selected for survey were:

Hope Pastures, Aylsham (Upper);

Meadowbrook, Mona Heights, and Harbor View (Middle Income); and

Independent City, Duhaney Park, and Stand Pipe (Lower Income)

8.3 Training of Enumerators

All enumerators arrived by 10:00 a.m. on May 17. After preliminary discussions the purpose of the survey was explained and the survey instrument reviewed. In their training session in the afternoon, enumerators were allowed to review the questionnaires and clarify the problems.

On May 17, Dr. Jones proceeded with four (4) enumerators to Independent City and Dr. Singh with three (3) of the enumerators to Harbor View. This was done to ensure the quality of the data collected. Each enumerator conducted at least one household in his area of assignment in the presence of either Dr. Singh or Dr. Jones. The major problem encountered was about the information on age of the persons and personal income status. Some respondents were also sensitive about the question on

ethnic origin. In general, enumerators did well in getting the information. The team assembled in the evening and discussed the problem of each enumerator. Each questionnaire was carefully reviewed and edited. In a few cases, enumerators were advised to return to the household and to get the missing information. The enumerators realized that the working people are generally not at home during the day time and they expressed the opinion that data collection should continue on Saturday and Sunday. To this we readily agreed, as it would help to reduce bias. In the evening, Jones and Singh visited Mr. Rudolph Daley, Horticulturist, and a friend of Dr. Jones. Mr. Daley proved to be very resourceful to us in many ways.

8.4 Editing and Reviewing of the Completed Questionnaires

The enumerators assembled on Saturday, May 19, morning in the lounge of the Senior Common Room of the University of West Indies and, after a brief discussion, they again went to their respective areas to continue data collection. CARDI was unable to provide transportation over the weekend so each enumerator was given an allowance to cover bus fares. Drs. Singh and Jones met them again on Sunday, May 20 at 10:00 a.m., edited the completed questionnaires and handed out questionnaires to be administered that day.

On May 21, again Drs. Jones and Singh met with the enumerators at 8:30 a.m., reviewed and edited the questionnaires that were completed on Sunday and handed out questionnaires for the remaining clusters. Data collection in Kingston was completed by Tuesday.

8.5 Survey Plan for Rural Area

On May 21, Jones and Singh met with Mr. Horace Payne and discussed the survey in the rural area. It was not possible to visit the rural area until Tuesday morning. The area selected for the survey was the

Parish of St. Elizabeth. This is the main peanut growing area of Jamaica. Mr. Payne had already contacted the officer in charge of the Parish, Mr. M. A. Montague for the arrangement of the survey. It was already planned that the survey will cover a wider range of farming systems.

Dr. Jones, Dr. Singh, and Mr. Payne travelled to Santa Cruz on May 22, where the office of the St. Elizabeth Land Authority is located. On their way to Santa Cruz, the team visited a farm where peanuts were planted only a week ago. The farm appeared to be well managed and from all accounts, the farmer was encouraged to grow more peanuts to meet the increasing demand for peanuts in the country. This farmer uses an irrigation system to maintain adequate moisture levels.

The team arrived Santa Cruz at 11:00 a.m. Mr. Montague and the enumerators were already present. The enumerators were extension officers from 11 different extension areas covering approximately 15-20 miles east-west and 10-15 miles north-south from Santa Cruz. Each area was considered a cluster for the survey.

The survey instruments were reviewed with Mr. Montague and the enumerators were trained. Each enumerator was given 10 survey instruments (consisting of consumption and post harvest handling of peanuts). Even though these were experienced enumerators, Mr. Montague was requested to monitor closely the quality of the work. The team returned to Kingston at the end of the day, as the following day was a public holiday.

May 23

This was a national holiday. In the afternoon, Dr. Singh and Dr. Jones had an opportunity to go to the beach with Mr. Daley and his family.

8.6 Meeting with Mr. Payne and Mr. Suah to Discuss Peanut CRSP Program in Detail

Drs. Jones and Singh met with Mr. Payne and Mr. Suah at the CARDI office at 9:00 a.m. on May 24. The following things were discussed: (1) The Peanut CRSP program; (2) The Peanut CRSP in CARDI; (3) The role of Alabama A&M University; (4) The role of the University of Florida; (5) Possible areas of research in Jamaica.

Mr. Payne has been working with peanuts in Jamaica for a number of years and has been advising peanut growers and also processors of peanut products. He expressed the need for research in post harvest handling of peanuts and improved packaging of peanuts in Jamaica. He has evaluated several varieties of peanuts in Jamaica; however, Valencia has been found to be the most commonly accepted variety. The problems encountered by the peanut farmers and processors are: (1) drying and curing of peanuts; (2) separation of testa; and (3) suitability of a variety for peanut butter. According to one processor, Valencia does not produce the right texture for the peanut butter. Further, there is a problem of separation of testa.

Mr. Payne collected samples from various markets in the Kingston area. It included: Unshelled peanuts (not cleaned); shelled peanuts with testa; shelled peanuts without testa; peanut brittle (a sugar coated product; peanut butter bar (peanut butter with cane sugar, corn syrup and coloring agents). Canned peanuts were not available in the market.

8.7 Meeting with Mr. Kenneth Leslie and Ms. Sailie Campbell

Mr. Suah, Dr. Jones, and Dr. Singh visited the Caribbean Food and Nutrition Institute and met Mr. Kenneth A. Leslie, Agriculture Economist and Ms. Sailie Campbell (Nutritionist) on May 24 in the afternoon. The scope of the project was explained but no commitment was made. It appeared, though, that Mr. Leslie or Ms. Campbell will be interested in the

peanut research. Mr. Suah also suggested that the Food Technology Institute has laboratory facilities and can be contacted for possible cooperation. It was his view that the plan of work and the memorandum of understanding need further clarification.

It was concluded, though, that in the Caribbean area Jamaica may be one of the possible sites of research, specially on post harvest handling and marketing of peanuts.

8.8 Survey in St. Elizabeth Area (Rural Site)

Dr. Singh and Dr. Jones left Kingston at 8:00 a.m. and arrived in Santa Cruz at 10:00 a.m. on May 25. By 11:00 a.m., all enumerators brought their questionnaires and collected samples to the Land Authority office. Each one of the questionnaires was reviewed by Dr. Singh or Dr. Jones. One set of questionnaires was returned and the enumerator was advised to provide the missing information. The major problem encountered by the several enumerators was about the income.

8.9 Additional Information Regarding Peanuts

Additional information was obtained from Mr. Montague. The St. Elizabeth area produces about 98% of the peanuts in Jamaica. In 1984, 4,600 acres were planted. Almost all farmers used the variety Valencia. The average yield per acre of peanuts is 0.5 tons. The recommended rate of peanut seeds per acre is 64 lbs. The seeds are self-produced and stored with hulls in dry condition in plastic bags. The land is prepared by tractors. Sewing of seeds is not yet mechanized. No herbicides are used for weed control. Weedings and moldings are done only once in the season. Farmers follow fertilizer recommendations. Most commonly present insects are caterpillars and borers. The planting seasons are: August-September and November and December. However, planting could be done anytime. Most

farmers sell the peanuts right after the harvest. Harvesting is done by hand and the nuts are hand picked after drying in the field. Nuts may be further dried. The yield will depend on the soil type and weather conditions. There are three distinct peanut producing areas depending on the predominant soil type and the level of rainfall. The first area has an annual rainfall of 45" to 50", and the dominant soil type is the St. Ann Clayey loam, a red bauxite soil. This area may experience drought conditions. The second area has an annual rainfall of 60" to 66" with prior distribution. The dominant soil type is the Newel clayey loam, a brown bauxite soil. In this area rainfall is supplemented with irrigation and farmers are able to produce three peanut crops per year. The third area has an annual rainfall of 70" - 80" per year with very good distribution throughout the year. The dominant soil type is the Chudleigh clayey loam which is also a brown bauxite soil. Mr. Montague explained that farmers preferred Valencia because of its early maturing characteristic and it has disease resistance better than other newer lines. Mr. Montague pointed out that peanuts are used more widely in St. Elizabeth areas in a variety of forms such as drink, as ingredients in cooking rice, and other staples. A recipe has been developed (See Attachment No. 2). Drs. Jones and Singh returned to Kingston in the evening and were later invited by Mr. Suah for a dinner.

Drs. Jones and Singh left Kingston at 8:30 a.m. and arrived Huntsville at 8:30 p.m.

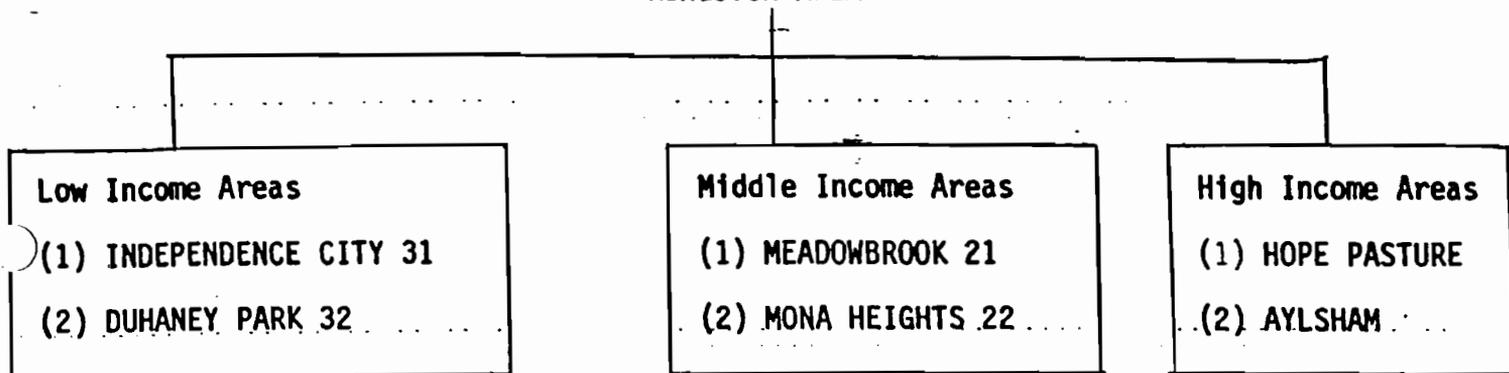
8.9 Recommendations

Dr. Singh and Dr. Jones would like to make the following recommendations:

- (1) Jamaica should be considered as one of the possible sites for research on post harvest handling, processing and marketing of peanuts.

- (2) A meeting of collaborators in the Caribbean should be arranged soon to develop organization to plan future research on peanuts. All the collaborators should be made fully aware of the goals and objectives of the Peanut CRSP.

THE GREATER
KINGSTON AREA



ENUMERATORS

- | | |
|--------------------|----------------------|
| (1) Andrea Reid | (5) Garnet Peterkin |
| (2) Peter Smith | (6) Michael Richards |
| (3) Wayne Bowden | (7) Adrian Rose |
| (4) Carlton Wallen | |

Figure 1. Scheme of Survey on Consumption of Peanuts in Jamaica (urban site).

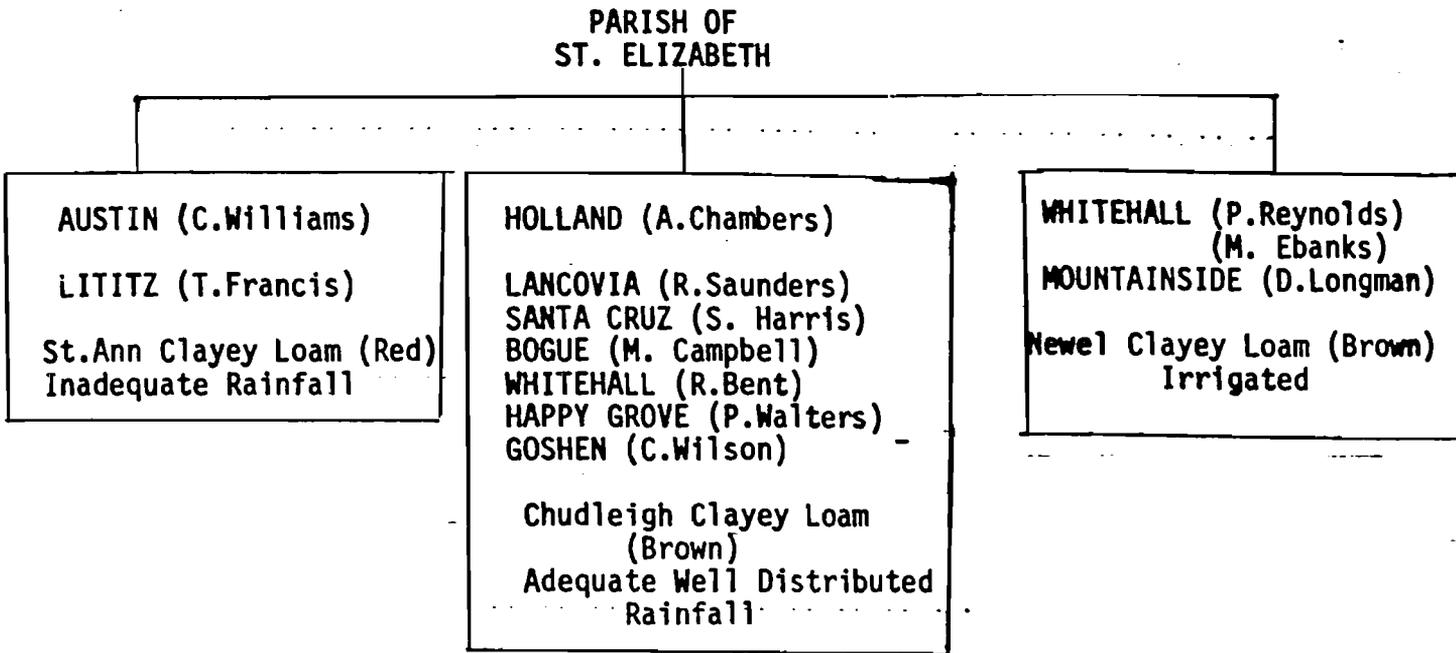


Figure 2. Scheme of Survey of Post-Harvest Handling and Consumption of Peanuts in Jamaica (rural site).

Peanuts are rich and nutritious

PEANUTS ARE identified in street talk as parallel with anything that is cheap. However, the nutritional value of this tiny food source belies such description.

Agronomists have long identified peanuts, or 'ground nuts' as they are known in the Caribbean, as an almost instant means of providing natural and cheap improvement for poor soils.

Householders who live in new developments where the top soil was removed during construction can consider putting in a crop of peanuts in the front and backyard.

It will make an attractive ground cover and after a while there will be a protein-rich harvest for the family.

At crop time, the plant itself can be plowed back into the land to provide natural fertiliser.

The late Afro-American scientist George Washington Carver bequeathed to the world a wide range of practical uses for this humble peanut. In doing so he helped to rejuvenate the soil that had been 'starved' by the cultivation of cotton, and boosted the economy of the state of Georgia, which now shares with India and China the honour of being the principal suppliers of peanuts and its by-products to the rest of the world.

The most popular of Carver's experiments is peanut butter.

Teamed with any kind of jelly, it is the favourite of millions of youngsters and adults — especially mothers who depend on it as a nutritious and instant staple for lunches and snacks in various parts of the world.

Since peanuts are high in nutritional value, being an excellent source of B vitamins, minerals and roughage, the only people who need eat them sparsely are weight watchers, since each ounce contains 170 calories.

Peanuts are used in a wide range of dishes; sweet and savoury.

The Trinidad and Tobago merchants of yesteryear sold sugarcakes and "calomels" made of sugar and peanuts, and a sizable number of vendors (usually younger men) now employ themselves selling salted and freshly roasted nuts which they call 'Itals.'

In preparing peanut flour, an essential ingredient in many Afro-Asian recipes, the traditional mortar, the hand-powered mimer or mill or an electric blender can be used.

The shelled nuts, roasted and with their skins removed, must be sifted after grinding. This ground flour can be added to ground meat to make a delicious and nutritious meat loaf.

See peanuts recipes on next page

Peanut recipes

GROUND peanuts also enhance chicken, and peanut sauce on chicken is a national dish of Peru. Many oriental countries have a special recipe for this combination. Try this one.

ORIENTAL PEANUT CHICKEN

Chicken legs, thighs and/or wings
1 lg onion
1 christophene
1 med carrot
2 stalks celery

METHOD

Season chicken with crushed ginger and garlic, Soy sauce, mixed Chinese seasoning powders and salt and pepper to taste.

Peel and slice onion, carrot, christophene and celery.

Dissolve two ounces of crushed peanut by pouring one pint of boiling water over and stirring until well blended.

Make colouring by melting one medium spoonful of brown sugar in one to two large spoons of cooking oil. Add chicken when oil is dark and bubbling. Stir so chicken is evenly browned. Lower heat and let cook, stirring occasionally and basting with warm water if necessary.

When chicken is tender add vegetables and cook for three minutes.

Stir the dissolved peanuts and pour over the chicken vegetable mixture. Cover and let cook at low heat stirring occasionally, until extra liquid is absorbed and chicken and vegetables are in a rich gravy.

PEANUT MEAT LOAF

½ lb ground meat
2 eggs
½ lb peanuts, ground
4 slices toasted bread, ground
1 med sized onion
Chive, thyme and other seasoning herbs to taste
Salt and pepper to taste

METHOD

Mix meat, nuts, breadcrumbs, onion and seasonings and blend with well-beaten eggs to which were added three tbsps milk.

Pack into a lightly greased tin or ovenware dish and bake for 30 to 45 minutes in a moderate oven. Test by inserting a knife. If it comes out clean, loaf is ready.

The mixture can also be shaped into patties and cooked in a well greased heavy frying pan, turn when cooked on one side with a spatula to avoid breaking.

Served with boiled rice, (or noodles or mashed ground provisions) a green vegetable and tomato sauce, this is a very tasty and nutritionally balanced meal.

ATTACHMENT NO. 1

PEANUT ROLLS

- 2 cups flour
- 1 cup sugar
- 1 cup milk
- 2 tbsps. butter
- 1 cup coarsely chopped peanuts
- 1 tsp. baking powder
- 1 egg
- 1/2 inch of salt

Method

1. Sift flour, salt and baking powder into a bowl.
2. Rub in butter, nuts and sugar. Mix to a stiff dough with the egg and milk.
3. Turn onto a floured board, and roll out two-third of an inch thick.
4. Cut into bars of convenient size and fry until golden brown.

PEANUT ROLLS

- 2 cups white soft bread crumbs
- 4 tbsps. peanut butter
- 1 cup grated coconut
- 1 tsp salt
- 1 egg well beaten
- 1/2 lb. blanched ground nuts

Method

Mix thoroughly, make into rolls and fry in deep fat, or bake in an oven. Serve with nut sauce.

PEANUT WAFERS

- 2 cups flour
- 1 cup water
- 1 cup sugar (powder)
- 1 cup ground peanuts
- 1/2 cup butter

Method

1. Cream butter and sugar together until light and creamy.
2. Add flour and water alternately.
3. Add peanuts, drop on buttered tins and bake quickly.
4. Cut into squares while hot, as it gets brittle soon after cooking

BEST AVAILABLE

Source of recipe - Farmer's Food Magazine

PEANUT

21

RECIPES

Use standard recipes for the following adding 1 cup coarsely chopped or ground peanuts to every 2 cups of flour used:-

- 1. Peanut Fruit Cake
- 2. Peanut Bun
- 3. Peanut Muffin
- 4. Peanut Rock Cakes

Peanut Bread

- 1/2 cup chopped, blanched nuts
- 1/2 cup milk
- 2 cups flour (sifted)
- 1 beaten egg
- 1/2 c. Sugar
- 2 tbsps. baking powder

Method

1. Mix dry ingredients together. Add chopped nuts and blend thoroughly.
2. Mix beaten eggs with milk and add to dry ingredients.
3. Shape into small loaves, leave for 1/2 hr. Bake in a slow oven until done, about 50 mins.

ATTACHMENT NO. 2

PEANUT LOAF

1 tbs. Chopped onion
1 egg
1 cup bread crumbs
1 cup red peas pulp
2 tbsps. fat
juice of $\frac{1}{2}$ lemon
 $\frac{1}{2}$ cup hot water
 $1\frac{1}{2}$ cups chopped peanuts
dash of pepper
1 tsp. salt

Method

1. Cook onion in fat until golden brown.
2. Add hot water and simmer until tender.
3. Mix other ingredients, adding the egg last.
4. Combine mixture with onion mixture.
5. Pack into well greased baking dish and bake until golden brown.

BAKED PEANUTS

4 cups shelled raw peanuts 4 tbsps. oil

Method

1. Cover peanuts with cold water and soak overnight.
2. Boil for 10 mins. remove from water and dry.
3. Add oil and mix well.
4. Place in a well greased baking dish and bake until thoroughly cooked and well brown.

N.B. If extra seasoning is desired, a small amount of ketchup salt, molasses and mustard may be added during baking as for baked beans.

MOCK CHICKEN

peanut 1 egg (beaten) 1 egg white bread crumbs
salt sweet potatoes oil for frying

Method

Blanch and grind a sufficient amount of peanut until oily. Stir in one well beaten egg. If too thin thicken with bread crumbs etc. in salt taste. Boil sweet potatoes until done, peel and cut into thin slices, spread generously with peanut mixture. Dip in egg white, fry to chicken brown. Serve hot.

PEANUT COOKIES

$1\frac{1}{2}$ cups finely chopped nuts 2 $\frac{3}{4}$ cups flour
 $\frac{3}{4}$ cups fat $\frac{1}{3}$ tsp soda
1 cup sugar $\frac{3}{4}$ tsp. salt
1 egg $\frac{3}{4}$ tsp. cinnamon
 $\frac{3}{4}$ cup molasses $\frac{3}{4}$ cup milk

Method

1. Cream the fat. Add the sugar gradually and cream thoroughly.
2. Add the beaten eggs, then the molasses. Beat thoroughly.
3. Add the mixed dry ingredients, milk and chopped nuts. Mix thoroughly.
4. Drop by rounded teaspoonful onto greased baking sheets.
5. Bake in moderate oven for 12 to 15 mins. Remove from baking sheet while hot. Serve 15

PEANUT BRITTLE

2 cups G. sugar 1 tsp. salt 1 pt. chopped peanuts

Method

1. Put granulated sugar into a frying/and heat slowly, stirring/pan constantly, until sugar is melted and turn light brown.
2. Put finely chopped peanuts in a buttered tin and sprinkle with salt.
3. Warm slightly and pour melted sugar over them. Put on back into desired shape and size when cooled.

PEANUT SALAD

1 small cabbage 1 cup vinegar 1 tsp. flour
1 tsp. butter 1 tsp. mustard 1/2 tsp. pepper
2 tbsps. salt 2 eggs 1 pt. peanuts

Method

1. Chop cabbage and peanuts fine. Add salt and pepper.
2. Cream butter, mustard, flour and sugar together. Stir in vinegar.
3. Cook in double boiler until stiff, add yolks of eggs, pour over nuts and cabbage and serve.

PEANUT BAKED WITH RICE

4 cups milk 1/2 cup sugar 1 tsp. salt
1/2 cup rice 2 tbsps. lime juice 1 cup coarsely ground peanuts

Method

1. Wash rice. Put layers of rice and layers of peanuts into a well greased baking dish.
2. Mix salt, sugar, and lime juice, sprinkle each layer with it. Finish with a layer of peanuts on top, pour on milk. If rice is not covered put in sufficient water.
3. Bake for 3 hrs. in a very slow oven, add hot water if it cooks too dry.

STEAK WITH PEANUT

1 lb. beef 1 cup shelled raw peanut with skin
Onion, Escallion, Thyme, Tomato and Oil for frying.

Method

1. Cut beef into pieces and brown.
2. Heat peanuts, strip and roll to a thick paste.
3. Fry onion, escallion, thyme and tomato in oil.
4. Add peanut paste and stir well. Add beef.
5. Cover and allow to cook slowly over moderate heat. Serve hot.

PEANUT BUTTER

2 cups shelled peanuts 1/2 tsp. salt
1 tbsps. oil

Method

1. Roast the peanut to a light brown, take off skin.
2. Cover with boiling water for 1 min. Drain.
3. Rub through sieve or grind in a mill, or pound in a mortar until very fine.
4. Add oil and salt, mix well. Keep in tightly covered closed glass jars.
or
5. After grinding the peanut, seal in glass jar or bottle until ready to use. When ready to use take out small quantity and rub up with a little hot water and salt to taste.

MACARONI & CHEESE

1 cup broken macaroni 1/2 lb. cheese 1 tsp. salt
1 cup milk 2 tbsps. flour 2 qts. water
1 cup coarsely ground peanut dash pepper bread crumbs

Method

1. Cook macaroni adding salt to taste.
2. Drain and pour cold water over to prevent from sticking together.
3. Mince cheese and mix all other ingredients except macaroni.
4. Put sauce and macaroni in alternate layers in a well buttered baking dish.
5. Cover with buttered crumbs and bake slowly until crumbs are brown.

PEANUT BROWNIES

3/4 cup flour	1 cup sugar
1/2 tsp. baking powder	2 eggs beaten
1/2 tsp. salt	1/2 tsp. vanilla
1/2 cup butter	3/4 cups peanuts (chopped)

Method

Grease an 8x8x2 inch pan. Start oven 10 mins. before baking, set at 350° F. Sift flour, measure, resift with baking powder and salt. Melt butter in a sauce pan over low heat, add sugar and stir with wooden spoon until smooth, then remove from heat. Cool slightly, then beat eggs in until well blended. Beat in vanilla, then flour mixture until smooth. Stir in chopped nuts. Spread batter in prepared pan to even thickness. Bake 20-22 mins. Mark, cool in pan, then cut and store in tightly covered jars.

PEANUT LIQUEUR

4 oz roasted peanuts,	4 cups rum
3 lbs. sugar	8 lines
8 cups water	4 tsps. cinnamon

Method

1. Grind peanut after removing some of the red covering.
2. Put in glass or enamel container, add lime juice from 8 lines and rind of 4 lins and cinnamon.
3. Dissolve sugar in water and pour onto mixture.
4. Add rum, cover and leave for 5 days.
5. Strain through drip bag and bottle.

ATTACHMENT 3

Peanut Sugar Cake

1 lb. Sugar

2 cups shelled roasted peanuts

Small piece of root ginger

A bit (1") of cinnamon

1/2 teaspoon almond extract

1/2 cup water

Pastry wooden board

Dampen the board surface with water. Place sugar in sauce pan. Add water, spice and ginger. Stir till sugar dissolves. Boil in medium or high heat (240°F). Add peanuts. Stir until it can form a hard ball when a drop is put in cold water. Then it is ready for dishing out in forms and sizes desired on moistened board.

26	Q13 Food in Trade or Gifts Value Weekly (TT\$) (Note: Survey No. and Card No.: 2 of 3 (F4.0, F1.0))	F3.0
27	Q14 Consume peanuts Yes=1; No = 0	F1.0
28	Q15 Peanuts Stored for <u>Home Consumption</u> (lbs.)	F1.0
29	Q15 Sale? (lbs)	F1.0
30	Q15 Seed? (lbs)	F1.0
31	Q16a Peanut Oil = 1; Else=0	F1.0
32	Q16b Raw = 2	F1.0
33	Q16c Boiled = 3	F1.0
34	Q16d Roasted = 4	F1.0
35	Q16e Fried = 5	F1.0
36	Q16f Peanut Butter = 6	F1.0
37	Q16g Candy = 7	F1.0
38	Q16h Ingredient=Peanut Punch=8	F1.0
39	Q16i Other = 9 (Fried)	F1.0

40-59 Q17a-d Product Preference Snack for each group of family members

a) 1st digit (use code from 16a-i above)

b) 2-3 digits (number of days peanut snack eaten 1-30)
4(F1.0,F2.0,F1.0)

c) 4 digit (preference rank for peanut snack)

b) 5 & 6 digit (number of days peanut butter eaten)
4(F2.0, F1.0)

d) 7th digit (preference rank for peanut butter among spreads)

Group 1 = Male Head
Group 2 = Female Head
Group 3 = Children over 10 Group 4 = Children under 10

		<u>Amount(lbs)</u>	<u>Value(TT\$)</u>
60-61	Q18 Raw, in shell	(F3.1)	(F3.1)
62-63	Q18 Raw, shelled	(F3.1)	(F3.1)
64-65	Q18 Roasted, in shell	(F3.1)	(F3.1)
66-67	Q18 Roasted, shelled	(F3.1)	(F3.1)

Q28c Family Budget
Q28d Farming and Gardening
Informal, family & friends = 0
Newspaper, Books, Reading = 1
TV, Radio only = 2
Nothing, not interested = 9

THE GREATER
KINGSTON AREA

Low Income Areas

- (1) INDEPENDENCE CITY 31
- (2) DUHANEY PARK 32

Middle Income Areas

- (1) MEADOWBROOK 21
- (2) MONA HEIGHTS 22

High Income Areas

- (1) HOPE PASTURE
- (2) AYLSHAM

ENUMERATORS

- (1) Andrea Reid
- (2) Peter Smith
- (3) Wayne Bowden
- (4) Carlton Wallen
- (5) Garnet Peterkin
- (6) Michael Richards
- (7) Adrian Rose

Figure 1. Scheme of Survey on Consumption of Peanuts in Jamaica (urban site).

Note: Survey No. and Card No.: 3 of 3 (F4.0, F1.0)

	<u>Amount(lbs)</u>	<u>Value(TT\$)</u>
68-69	Q18 Fried (F3.1)	(F3.1)
70-71	Q18 Ground (F3.1)	(F3.1)
72-73	Q18 Peanut Butter (F3.1)	(F3.1)
74-75	Q18 In Candy (F3.1)	(F3.1)
76-77	Q18 Other (Peanut Punch) gal. (F3.1)	(F3.1)
78	Q21 Prepare peanut products at home =1 Buy finished peanut products = 2	(F1.0)
79	Q22 or Q23 Reasons for not consuming more peanuts 1 Diet balanced enough 6 Fattening & Expensive 2 Fattening 7 Not in Store; Not Routine 3 Don't like it; poor taste 8 Allergies; Diabetic 4 Blood Pressure 9 Difficult to prepare 5 Cost 0 None	(F1.0)
80	Q24 How do you feel about peanuts as a food? Q24a Plentiful = 0; or scarce = 1	11(F1.0)
81	Q24b Nutritious = 0; or not nutritious = 1	
82	Q24c Contaminated = 0; or clean = 1	
83	Q24d Expensive = 0; or inexpensive = 1	
84	Q24e Healthy = 0; or unhealthy = 1	
85	Q24f Full = 0; or empty = 1	
86	Q24g Unsafe = 0; or safe = 1	
87	Q24h Strong = 0; or weak = 1	
88	Q24i Easy Preparation = 0; or difficult preparation = 1	
89	Q24j Tasty = 0; or not tasty = 1	
90	Q24k Bland = 0; or not bland = 1	
91	Q25 Read Newspaper Yes=1; No=0; Occasionally = 2	F1.0
92	Q26 Listen to Radio Yes=1; No=0; Occasionally = 2	F1.0
93	Q27 Watch TV Yes=1; No=0; Occasionally=2	F1.0
94	Q28 What is your main source of information for: Q28a Nutrition Q28b Food Preparation	4F1.0

**Peanut CRSP
CARIBBEAN TRIP REPORT**

Traveller: E. M. Ahmed

Countries Visited and Period of Travel:

Jamaica (AID, CARDI, Food Technology Institute)
Trinidad (CARDI and University of the West Indies)
10-16 December 1984

Purpose of Trip:

1. Discuss with CARDI Personnel at Jamaica and Trinidad the possibility of establishing direct contacts with CARDI personnel research studies on varietal improvement through breeding, selection, yield potential and post harvest studies in Jamaica, the leeward and windward islands of the Caribbean region.
2. Discuss with the Food Technology Institute in Jamaica and the University of West Indies in Trinidad the possibility of direct contacts to establish post harvest studies and processing (product development phase) with food scientists at these two institutions.
3. Discuss CRSP projects with AID personnel at Jamaica and Barbados.

Executive Summary:

The agreements reached for direct cooperation with specific CARDI personnel at different locations in the Caribbean region (and food scientists at FTI and UWI) are constructive and productive approaches to conduct research to solve problems in the breeding, cultivation practices, post harvest handling and food product improvement. A plan of work in the post harvest handling and evaluation of existing food products containing peanuts was executed and agreed upon by Dr. G. Sami of the UWI and Dr. D. Cummins and Dr. O. Okezi, the administrators of Peanut CRSP.

A similar approach will be established in the near future with the director of FTI in Jamaica, since the director was out of the country during our visit to that institute. However, the acting director of the FTI and the chairman of the Scientific Research Council which oversees the FTI were supportive of the idea of incorporating the FTI with AID peanut CRSP.

Dr. Parasram, the director of CARDI supported the idea of direct contacts with several CARDI personnel to act as coordinators of Peanut CRSP activities in specific regions of the Caribbean area. He also supported the idea with direct contacts with food scientists at FTI (Jamaica) and UWI (Trinidad).

Details of Trip:

10 Dec. 1984

Left Gainesville, FL about 8:00 AM by personal car to Tampa, FL since the scheduled PBA flight was cancelled due to the tragedy that happened 2 days earlier

Some of the problems with peanuts in Jamaica:

1. low yield which necessitates high price.
2. lack of defining the proper maturity stage to harvest. At present, farmers use the criteria of appearance of leaf spots on the peanut plant as the proper time to harvest. This could be symptoms of disease and not the proper physiological stage to harvest.
3. lack of proper curing and storage of peanut seeds resulting in high moisture seeds. There is need for proper post harvest handling and storage techniques.
4. Mold contamination during storage and handling and the possibility of aflatoxin contamination. There is no available monitoring system for aflatoxin contamination.
5. There is the need to have available equipment for the planting, spraying, harvesting, and shelling of peanuts suitable for the small scale farmers and the large scale farmers.
6. There is need to determine the effectiveness of Rhizopia to fix nitrogen in Jamaican soil.

Mr. Payne stated that enough peanuts could be produced in Jamaica for local consumption and export. There is a shortage of coconut oil in Jamaica (due to a disease that killed a large percentage of the trees). Jamaica is considering soybean seeds to fill this shortage of oil. But Mr. Payne thinks that peanuts could be used for this purpose.

The CARDI office in Jamaica does not have staff to do Food Technology work with peanuts.

At 11:30 we met with Mr. V. Rochester at the AID mission office. Mr. Rochester stated some of the problems with peanuts in Jamaica:

1. low yield of small seeded varieties
2. poor drying, curing and storage conditions
3. contamination - need monitoring system

Mr. Rochester also stated that peanuts are not included with the self sufficiency program established by the Jamaican Government, but it is one of the subsectors. There are five sectors for self sufficiency: Rice, Sorghum, soybean, aquaculture and beef and milk.

Rice: Jamaica can import rice cheaper than growing it, due to the deevaluation of the Jamaican dollar

Soybean: as source of oil to replace the vanishing coconut oil - the press cake is used for animal feed. Peanuts can be included for this purpose.

Sorghum: requires less irrigation than corn or sugarcane.

telephone. Dr. Hall expressed interest in the peanut CRSP project and expressed desire for the FTI to cooperate and get involved with peanut product development in Jamaica. Dr. Al Hall telephone numbers at SRC are 809-927-4471, 4473, 4473, 4474.

We met with Mr. Vernan Morris, Manager Argo Business, Agro 21. His telephone number is 809-922-14709. Agro-21 is a concept partially funded by US AID, and could serve as a driving force in Jamaica economy. Mr. Morris stated that consumption of peanuts is about 5 million pounds. There are numerous small scale farmers (1-2 acres) - peanuts are not profitable now in Jamaica because of the low yield. There is need to improve yields by the use of better varieties and better cultural practices. Peanut use in Jamaica will be limited to roasted nuts and existing processed peanut products. It is difficult to make Jamaicans accept new foods. Mr. Morris recommended that the private sector need to be involved at the onset in the production and processing of peanuts in Jamaica. We arrived at the airport about 1:00 PM to clear immigration and customs and prepare for our flight at 2:30 PM to Trinidad, W.I. We arrived in Trinidad about 8:30 PM, went through immigration and customs and we arrived to St. Benedictine guest house about 10:00 PM.

13 Dec. 1984

Arrived CARDI 8:25 AM.

Met with Dr. Forde, Director of Research and Development in the absence of Dr. Parasram, the Executive Director of CARDI. We introduced the concept for Peanut CRSP and the desire to establish direct contacts with selected CARDI staff at given regions of the Caribbean. He referred us to Dr. Hague who was the coordinator of Peanut CRSP in the past. He stated that peanuts is an important crop in the Caribbean, a limited amount of acreage (about 500 acres) could be devoted to peanut planting - as a part of acreage allotted primarily for sugar cane production. This peanut allocation could be cultivated and harvested mechanically - but the small farmers can grow small acreage without the benefit of using mechanized equipment. Largest areas for peanut production will be in Jamaica and St. Vincent. St. Vincent has sandy loam soil with medium fertility and a pH of 6.5 and adequate rainfall, all these are suitable for peanut production. Guyana import peanuts from St. Vincent and pay in return with rice. He helped us get in contact with Dr. Whelemsly and Ms. Rodriguez to get the results of peanut consumption survey that was done May 1984.

We met with Dr. G. Sammy, a food scientist with the University of West Indies. We discussed with him the possibility of having a MOU and a plan of work entity completely separate from CARDI. He agreed to the idea and a work plan with his inputs were formulated, also a separate MOU to be executed with the University of West Indies was prepared in the afternoon of 13 Dec. 1984. Dr. Cummings borrowed an electrical typewriter and typed both documents. We returned to the hotel about 7:00 PM. Dr. Sami's input will be involving post harvest physiology and evaluation of existing peanut food products.

14 Dec. 1984

We met with Dr. Parasram at 8:30 AM and discussed with him what was accomplished the previous day at CARDI and UWI. He agreed and approved the ideas of having direct contacts with selected CARDI staff and the separate agreement with UWI. He set a date of 14, 15 Jan. 1985 for Dr. Cummins and Dr. Okezie to have a joint

CONFIDENTIAL

PEANUT CRSP - CARIBBEAN

CARIBBEAN AGRICULTURE RESEARCH DEVELOPMENT INSTITUTE
SURVEY ON POST-HARVEST HANDLING OF PEANUTS IN THE CARIBBEAN

Survey No: _____ Date: 22/5/84 Interviewer: S. SIMON

Respondent's Name: CAROL JAMES Cluster No: _____

Address: BRIDGE ROAD House No.: _____

Lane: _____

Street: _____

District: 6 County/Parish: _____ Country of Caribbean: SVG

Religion: Anglican Ethnic Origin: Negro

1. Total acres cropped 1983

0803
000
0000

	Land Owned		Land Leased	
	All Crops	Peanuts	All Crops	Peanuts
1st Season			34	1
2nd Season				
3rd Season				

2. Last Peanut Crop Harvested

03
145
1

Date Planted	_____	<u>Nov</u>
Area Planted	_____	<u>1</u>
Seed (lbs)	_____	<u>45</u>
(Variety)	_____	<u>Local</u>

3.a. Where was the seed acquired

26

Government	()	()
Private agents	()	(✓)
Self produced	()	()

100

4. Was seed treatment used? (Yes / No) (Yes / No)

41

- 4.a. Peanut Rotated after (name crop) _____
- b. Peanut Intercropped? (name crop) Corn
- c. Soil type _____

Land Owned Land Leased/Rented

5. Peanut Fertilized
- a. Commercial Fertilizer(acres) _____ 03
- b. Amount of Fertilizer(lbs) 75 075
- c. Type of Fertilizer N-P-K
- d. Peanuts Manured (acres) _____ 00

6. Peanut Weeding
- a. (Days after Planting)
- 1st Weeding Completed () (21) 21/5/84
- 2nd Weeding Completed () (51)
- 3rd Weeding Completed () (80) 0
- b. Was herbicide used? Yes / No 0
- Type _____ Date _____

7. Peanut Harvested (Ripping)
- Date Completed _____ 03
- Area (acre) _____ 14 03
- Nuts (lb) _____ 1450 145

8. How many days of labor were required for harvest(through storage or sale)?
- Children _____ 00
- Men in family _____ 00
- Women in family _____ 00
- Hired men _____ 7 02
- Hired women _____ 6 06

9. How is maturity of peanuts determined A record is kept.

10. Were peanuts harvested at proper maturity?
- Yes, () (✓)
- Somewhat early () ()
- or Somewhat late () ()

11. If peanuts were not harvested at proper maturity, state reasons why.

CONFIDENTIAL

PEANUT CRSP - CARIBBEAN

CARIBBEAN AGRICULTURE RESEARCH DEVELOPMENT INSTITUTE

A SURVEY ON PEANUT CONSUMPTION IN THE CARIBBEAN

122671

Survey No: _____ Date: 22/5/84 Interviewer: S. S. HOY

Respondent's Name: CARLOL JACK Cluster No: _____

Address: BRIDGE TOWN House No.: _____

2 Lane: _____

Street: _____

District: 6 Parish/County: _____ Part of Caribbean: SVG

Religion: ANGLICAN Ethnic Origin: NEGRO

1. How many persons are there in your household? That is how many eat their meals regularly in your home? (Do not include visitors of less than one month) 3

2. List the head of household first and then list the names, ages, and relation of other household members to head of household.

Household member number	Name (First & Last)	Sex	Age	Relationship to Head (Father, Son, Household Worker, etc.)
1	Johnson Jack	M	60	Father
2	Louise "	F	58	Mother
3	Carlos "	M	31	Son
4				
5				
6				
7				
8				
9				
10				

3. Years of Education: Elem/Primary Secondary University Other (Specify)
- Male Head 0,1,2,3,4,5,6,7,8 0,1,2,3,4,5,6 0,1,2,3,4 1000
- Female Head 0,1,2,3,4,5,6,7,8 0,1,2,3,4,5,6 0,1,2,3,4 0000
4. How many wage earners including yourself live in this household? 2
5. Which members were these and where employed?

Member's Name (Number)	Employer Govt/Private	Type of Job or Work
Johnson #1	Private	Farming
Carlos #3	Private	Farming

6. Check the range that best fits your total household income from all sources in 1983.

Under 500 \$ ()	9,000 - 10,999 \$ ()	25,000 & above ()
500 - 999 \$ ()	11,000 - 12,999 \$ ()	
1000 - 2999 \$ ()	13,000 - 14,999 \$ ()	
3000 - 4999 \$ ()	15,000 - 16,999 \$ ()	
5,000 - 6,999 \$ ()	17,000 - 18,999 \$ ()	
7,000 - 8,999 \$ (✓)	19,000 - 24,999 \$ ()	

7. Do you eat your main meals at home? Yes No
8. If yes, who does the primary food preparation? (Specify name and number) Louise #2
9. Who is in charge of the family food storage? (Specify family member name and number) Louise #2
10. Who does the primary shopping for food? (Specify name and number) Louise #2
11. About how much does your household spend for food per week, (not including money spent for meals eaten away from home)? \$ 8.00
12. What is the value of home-grown food eaten by household per week? \$ 2.00
13. What is the value of (payment-in-kind, trade or gifts) food eaten by household per week? \$ 0.00

1102

20. If you acquired peanut oil during the past month, where did you buy or how did you acquire it?

	Place(s) Purchased (Specify location)	Amount	Value
a.	Market _____	_____	_____
b.	Grocery Stores/Supermarkets _____	_____	_____
c.	Roadside Stalls/street vendors _____	_____	_____
d.	Home produced _____	_____	_____
e.	Others (Specify) _____	_____	_____

21. Does the person who usually prepares the food prefer to (check one)

- (1) a. cook peanuts at home ()
- b. buy finished peanut products ()

22. If your family consumes peanuts, what are the reasons for not consuming more peanuts? (Specify) _____

23. If your family does not eat peanuts, please explain why? Because of health reasons (family), I do not appreciate it.

24. How do you feel about peanuts as a food?

- a. Plentiful () or scarce (✓)
- b. Nutritious () or not nutritious (✓)
- c. Contaminated () or clean (✓)
- d. Expensive (✓) or inexpensive ()
- e. Healthy (✓) or unhealthy ()
- f. Full (✓) or empty ()
- g. Unsafe () or safe (✓)
- h. Strong () or weak (✓)
- i. Easy Preparation (✓) or difficult preparation ()
- j. Tasty (✓) or not tasty ()
- k. Bland () or not bland ()

25. Do you usually read the newspaper ?

(Check one) Yes (✓) No () Occasionally ()

26. Do you usually listen to the radio ?

(Check one) Yes (✓) No () Occasionally ()

27. Do you usually watch television ?

(Check one) Yes () No () Occasionally (✓)

28. What is your main source of information for:

- a. Nutrition? Books
- b. Food Preparation? Books & Radio
- c. Family Budget? Family
- d. Farming and Gardening? Radio

02
111
000
110
01

12

BEST AVAILABLE COPY

1. Does your family consume peanuts, peanut products or peanut oil? (Yes/No) Yes
 No, go to Question 23.

5. Please tell me the amount of peanuts you have in storage for the following uses:

Home consumption? _____ Sale? _____ Seed? _____ (Specify measure kg, lbs.)

6. In what forms are peanuts used by members of the family? (Check all that apply)

Peanut Oil (Raw Boiled Roasted Ground)
 Peanut Butter (In Candy As Ingredients)
 Indicate Type of Product _____

7.a. What peanut snack do members of your household prefer? (List in column a. for each family member)

b. How many times have peanut snacks been eaten in the past month? (List in column b. for each family member)

c. How would you rate your preference of peanut or peanut products as a snack food compared to other snacks. (Check one for each family member in column c.)

d. How would you rate your preference of peanut butter as a spread (compared to other spreads) (Check one for each family member in column d.)

Family Member	a. Product Preference	b. Number of Times Eaten In Month	c. & d. How much Preferred				
			Most Preferred	Moderately Preferred	About the Same	Less Preferred	Least Preferred
(Peanut Snack)			5	4	3	2	1
1. Man			()	()	()	()	()
2. Wife			()	()	()	()	()
3. Children (Over 10)			()	()	()	()	()
4. Children (Under 10)			()	()	()	()	()
5. Household Workers			()	()	()	()	()
(Peanut Butter)							
1. Man			()	()	()	()	()
7. Wife			()	()	()	()	()
8. Children (Over 10)			()	()	()	()	()
9. Children (Under 10)			()	()	()	()	()
10. Household Workers			()	()	()	()	()

18. Of the peanuts used during the past month by your household, list below the amount and value for each form in which they were acquired.

Form of Peanuts	Amount Purchased	Value of purchased Amount	Amount Received as Gift	Value of Gift
Raw, in shell	_____	_____	_____	_____
Raw, shelled	_____	_____	_____	_____
Boiled, in shell	_____	_____	_____	_____
Boiled, shelled	_____	_____	_____	_____
Roasted, in shell	_____	_____	_____	_____
Roasted, shelled	_____	_____	_____	_____
Fried	_____	_____	_____	_____
Ground	_____	_____	_____	_____
Peanut Butter	_____	_____	_____	_____
In Candy	_____	_____	_____	_____
Peanut Oil	_____	_____	_____	_____
Other (Specify)	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____

19. If you used peanuts or peanut products during the past month, from where did you obtain them?

Place(s) Purchased (Specify location)	Amount	Value
a. Market _____	_____	_____
b. Supermarkets/Grocery Stores _____	_____	_____
c. Roadside Stalls/Street Vendors _____	_____	_____
d. Home Produced _____	_____	_____
e. Other (Specify) _____	_____	_____

Indicate operations from harvest to storage or sale. (Include drying, thrashing, cleaning, and days required for each step).

Operation	Description	Duration(Days)
1st	Ripping	2
2nd	Washing	2
3rd	Selecting	1
4th	Drying	3
5th		

Are peanuts gleaned from fields for food? NO For sale? YES

Sale of peanuts (actual)

To Whom	Price / lb.	Total lbs
HASKERS	3.00	90

BEST AVAILABLE COPY

14. Which members of your family were employed part-time on other farms during peanut growing season?

Members Name	Days		
	Planting	Weeding	Harvesting
None			

15. Information about peanuts in storage
- | | For Food | For Seed | For Sale |
|---|---|----------|----------|
| a. Quantity thrashed (harvested)? (lbs) | | | 90 |
| b. Quantity used? | 10 | | |
| c. Quantity stored? | | 45 | |
| d. Where are peanuts stored? | | | |
| e. Type of storage container? | | | |
| f. Problems in storage (insects, molds, rodents, theft, germination, heating, rancidity or any other/specify) | 1st | | Insects |
| | 2nd | | Rice |
| | 3rd | | |
| | 4th | | |
| g. Amount of loss in storage (Total) | This quantity for food was stored sent to food bank | | |
16. Take 100 gm sample of peanuts stored for food. Use numbered plastic bag supplied.
- General observations, shells damaged, rot, mold, rancid, etc.

TABLE 2

Budget for Alabama A & M University (Florida)
 Food Technology Project (AAM/FL/FT/CAR)
AID FUNDS

<u>Category</u>	<u>FY82</u>	<u>FY83</u>	<u>FY84</u> <u>Cost Shared</u>	<u>FY85</u>	<u>FY86</u>
Salaries	\$ -	22,500	25,673	25,673	25,673
Fringe Bene.	-	225	257	257	257
Supplies & Equipment	-	30,340	34,618	34,618	34,618
Travel	-	8,100	9,242	9,242	9,242
Indirect Costs	-	<u>20,036</u>	<u>22,860</u>	<u>22,860</u>	<u>22,860</u>
Total	-	81,201	92,650	92,650	92,650
<u>Not Cost Shared - Pass Through Funds</u>					
Total	-	37,977	43,473	43,473	43,473
Total AID	-	119,178	136,123	136,123	136,123
<u>NON-FEDERAL COST SHARED FUNDS</u>					
Total AAM/FL	-	49,697	56,704	56,704	56,704
GRAND TOTAL	-	168,875	192,827	192,827	192,827

BEST AVAILABLE COPY