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THE ANNUAL REPORT OF THE BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM (CRSP) 1981

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THE ANNUAL REPORT OF

THE BEAN/COWPEA COLLOBORATIVE

RESEARCH SUPPORT PROGRAM

(CRSP)

1981

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INTRODUCTION

The Bean/Cowpea CRSP is a coordinated effort established on September 30, 1980, to address hunger and malnutrition in Africa and Latin America through research on the production and utilization of beans (Phaseolus vulgaris) and cowpeas (Vigna unguiculata).

Beans and cowpeas are dietary staples in the countries associated with this CRSP. Among the poor, these legumes provide the major source of high quality, affordable protein, as well as an important source of B vitamins. The CRSP focus is on beans and cowpeas grown as food for household consumption, rather than as export crops.

Based on a global plan developed in concert with Host Country colleagues, the CRSP is made up of a series of discrete but integrated international research projects involving teams of scientists collaborating in a study of individual facets of the overall plan. Eighteen research projects, each led by a Principal Investigator from one of the U.S. research institutions, were developed from over 80 proposals initially received.

These vigorous international research partnerships directly involve research institutions in 12 Host Countries, 2 International Centers and 14 U.S. agricultural research institutions, including the nine having lead roles in the CRSP.

Special emphasis is placed on the needs and resources of the subsistence farm family. These family units are major producers and consumers of beans and cowpeas. As a group they are highly susceptible to problems of hunger, malnutrition, and poverty. Resources for food production are very limited, including productive soils, water, improved seed, fertilizer, pesticides, and machinery. Climates are often hostile, and farming operations are usually conducted by hand labor, although animal power is used when available.

Storage, preparation, and human utilization of beans and cowpeas present additional problems. Storage loss to insects is high, and represents debilitating loss of labor inputs as well as other resources. Traditional bean and cowpea preparation methods require high investments of not only water and fuel, but time and labor as well.

In much of the world, women are uniquely involved in production, storage, and utilization of beans and cowpeas. Therefore, it is reasonable that the Bean/Cowpea CRSP should maintain a special purview of the role of women and of the implication of CRSP research on women in its activities and objectives. The objective that application of CRSP findings must maintain or improve the quality of family ecology follows easily from the focus on women in international development.

Goal

Reflecting the mission of the "Famine Prevention and Freedom from Hunger Act" (Title XII) under which the program is funded, the goal of the Bean/Cowpea CRSP is to make a substantive contribution to the eradication of hunger and malnutrition in identified developing countries where beans and cowpeas are a major source of calories and protein.

Objectives Distributed Among Projects

- Variety improvement
- Insect and disease control
- Productive and stable farming systems
- Efficient nitrogen fixation and soil phosphorus utilization
- Drought and heat tolerance
- Improved nutrition and digestibility
- Improved seed and seed availability
- Reduced cooking requirements
- Improved storage and methods of preparation
- Understanding of the socioeconomic implications of agronomic intervention
- Understanding of the farming systems within which beans and cowpeas are grown

Objectives Shared by All Projects

- Training Host Country professional and technical personnel
- Development of research capability in collaborating institutions
- Participation of senior U.S. researchers with their counterparts in research institutions in Host Countries

Bean/Cowpea CRSP Strategy

The Bean/Cowpea CRSP strategy is to identify universal constraints to production, availability and consumption of beans and cowpeas, and to address them through research in settings where they have unique local importance.

The CRSP avoids duplicating existing research. It participates with national programs and regional and international centers in identifying constraints, and in planning and executing research. It will utilize the same linkages to disseminate its research findings.

Unique Features of the Bean/Cowpea CRSP

While the Bean/Cowpea CRSP shares common features with other CRSPs it has organizational or administrative characteristics which tend to give it a separate identity. These include:

1. A manageable number of Title XII Lead Institutions (9) and a straight-forward organizational structure.

2. Collaboration with a number of Host Countries including: Brazil, Cameroon, Dominican Republic, Ecuador, Guatemala, Honduras, Kenya, Malawi, Nigeria, Senegal, Tanzania.

3. Diffusion of 18 projects in East and West Africa, Central and South America and the Caribbean, averaging $97,000 USAID annual contribution per project.

   One country hosts 3 projects
   Three countries host 2 projects
   Eight countries host single projects

4. Prior to operational establishment of the CRSP the entire array of projects, U.S. and Host Country institutions, and investigators were identified in the planning process.

5. A Women in International Development Specialist on the CRSP Management Office staff.

6. U.S. Lead Institutions prepared to provide programmatic and fiscal management of research on either beans or cowpeas, supplemented by researchers from collaborating U.S. institutions to create teams with broad technical expertise and unique resources.

   One project includes 5 collaborating U.S. institutions
   One project includes 2 collaborating U.S. institutions
   Three projects include 1 collaborating U.S. institution
   The remaining 10 projects involve a single U.S. institution

   In addition, Boyce Thompson Institute for Plant Research will manage one project.

Features of CRSPs in General

The Bean/Cowpea CRSP is one of four current CRSP programs, which collectively involve 30 universities, 27 countries, and six international centers. Unique advantages of CRSPs include:

a. Involving leading scientists from U.S. institutions, many of whom would not otherwise be engaged in international work.

b. Obtaining major resource contributions from U.S. and Host Country institutions, which combine to nearly equal the USAID contributions.

c. Creating scientist-to-scientist and institution-to-institution linkages, with major emphasis on program activities in Host Countries.

d. Accruing dual benefits to both U.S. and Host Country agriculture which offer an incentive to state legislatures and universities to participate.

ORGANIZATION OF THE BEAN/COWPEA CRSP

The Bean/Cowpea CRSP Grant was awarded by USAID to Michigan State University on September 30, 1980. Michigan State University was designated as the Management Entity (ME) of the CRSP. The University has created a Management Office (MO) for CRSP activities. On January 2, 1981 the CRSP Management Office staff was expanded to its present size, and moved into new offices. Three groups work closely with the University and MO to guide the CRSP in areas of policy, budget management, technology, and review.

The Board of Directors

The Board of Directors, herein referred to as the Board, is the executive committee for CRSP policy and budget. It consists of 5 institutional representatives (IR's), elected for 2-year terms by the entire group of 9 IR's. IR's are designated by the presidents of their institutions to represent them for CRSP policy and administrative matters. They are typically administrators of international programs. The Board elects a chairman and secretary.

The members of the Board of Directors for FY-81 were:

Dr. J.F. Metz, Jr. (Chairperson)
Director, International Agriculture
Cornell University

Dr. Robert Hougas (Secretary)
Director, Experiment Station
University of Wisconsin

Dr. E. Broadus Browne, Director
Coastal Plains Experiment Station
University of Georgia

Dr. Dale Harpstead, Chairperson
Department Crop and Soil Sciences
Michigan State University

Dr. R.W. Kleis, Dean and Director
International Programs
Inst. of Agriculture & Natural Resources
University of Nebraska

The Board held five meetings during the year. Action taken at those meetings included:

1. Selection of a Director for the Bean/Cowpea CRSP Management Office, approval of additional support staff and creation of Management Office facilities.

2. Establishment of budget policies for the Management Office and project management.

3. Review and approval of contract documents to be used in Host Country negotiations (MOU, Subagreement) and review of document between Management Entity (MSU) and the Lead Institutions and Contractor in the United States.

4. Review and approval of project proposals, following recommendation to the Board by the Technical Committee and independent review by the Board.

5. Nomination of External Review Panel candidates for USAID/JRC action.

6. Certification of election of new members to the Board, and election of new members to the Technical Committee.

The report from Board Chairperson Dr. Joseph Metz is included as Appendix A of this report.

The Technical Committee

The Technical Committee, herein referred to as TC, advises the Board, ME, and MO in areas of research technology, project management, and technical review. It has specific responsibility for review of candidate projects for inclusion in the CRSP. The TC consists of five investigators engaged in CRSP projects from U.S. institutions, plus two international members - one from an international research center, and one from a participating Host Country institution. TC members are appointed to 2-year terms by the Board.

The members of the Technical Committee for FY-81 were:

Dr. Barbara Webster (Chairperson)
Department Agronomy & Range Science
University of California-Davis

Dr. Larry R. Beuchat (Secretary)
Department of Food Science
University of Georgia

Dr. M. Wayne Adams
Department of Crop & Soil Sciences
Michigan State University

Dr. Azuka Dike
Department Sociology/Anthropology
University of Nigeria

Dr. Jean M. Due
Department of Agricultural Economics
University of Illinois-Urbana

Dr. Donald H. Wallace
Plant Breeding Department
Cornell University

Dr. Aart van Schoonhoven, Coordinator
Bean Program - CIAT
Cali, COLOMBIA

The Technical Committee held 5 meetings during the year. Actions taken included:

1. Participation in the review of candidates for the Director for the Bean/Cowpea CRSP Management Office, and recommendations on selection to the CRSP Board of Directors.

2. Review of contract documents to be used in Host Country negotiations (MOU, Subagreement) and between the Management Entity (MSU) and the Lead Institutions in the United States (Subgrants).

3. Review and support of plans for major Bean/Cowpea-related publications, a State-of-the-Art (SOTA) being compiled by Dr. M. Wayne Adams, and an annual publication "Advances in Grain Legume Science" for which Dr. Donald Wallace is taking development responsibilities, as Editor-in-Chief.

4. Nomination of candidates to represent the Host Countries and International Centers on the Technical Committee.

5. Establishment of mechanisms for maintaining linkages with International Institute of Tropical Agriculture (IITA) and International Center for Tropical Agriculture (CIAT).

6. Substantive review of each project proposal. On the basis of initial review by committee members individually, the TC agreed as a group to forward proposals to the Board for approval, or return to the Principal Investigator for adjustments.

7. Recommendation of candidates for the External Review Panel to the Board.

8. Personnel recommendations in response to Technical Assistance requests.

9. Consideration of project reporting, forward planning and budgeting procedures to be established for each project Principal Investigator.

10. Plans for a Bean Workshop at CIAT (November, 1981) to strengthen linkages between project teams and the international center.

The report from Technical Committee Chairperson Dr. Barbara Webster is included as Appendix B of this report.

The External Review Panel

The External Review Panel, herein referred to as ERP, advisory to USAID, the ME, and the CRSP, will be responsible for review and evaluation of CRSP management and the progress of research activities. It will consist of eminent scientists experienced in research and management of development activities similar to CRSP programs. The ERP is to be appointed by USAID, with recommendations from the Board and ME

It is expected that the ERP will convene for the first time in November, 1982. The Board submitted its recommendations to USAID during FY-81, but no appointments were made within the fiscal year.

The Management Office

The Managment Office, herein referred to as MO, is charged with facilitating activities of the CRSP on behalf of the ME, providing staff resources to the Board and TC, and supporting activities of the ERP. MO consists of a Director, Deputy Director, Women in International Development (WID) Specialist, and Administrative Officer, plus office staff, totalling 4 3/4 FTEs.

The Management Office staff and facilities were initiated within FY-81. In January, 1981, the staffing was complete, and includes:

Dr. Donald R. Isleib, Director
Dr. Pat Barnes-McConnell, Deputy Director
Mrs. Nancy W. Axinn, WID Specialist
Mr. George A. Davies, Administrative Officer
Ms. Darlene Ashley, Administrative Assistant
Mrs. Mary K. Carter, Secretary

The offices, in 200 Center for International Programs, provide adequate work space and facilities for the on-going activities of the CRSP. Word processing equipment, capable of handling documentation and the accounting and bookkeeping for the multiple budgets of the CRSP, was purchased and installed.

The activities of the staff in the Management Office in FY-81 focused on getting projects from the planning stage into active collaborative research with appropriate documentation and budgetary support. In most cases, this included travel to the Host Country for a representative of the Management Office, with the Principal Investigator, and frequently co-investigators. Documents were reviewed with appropriate officials in the Host Country, including USAID mission personnel, Host Country government officials, and the institution of the Host Country Principal Investigator, usually a research station or university. In many cases, the documents were adapted in response to particular national or institutional requirements. Signatures on each document were obtained following those meetings. Typically, six months has been required to complete the CRSP documents.

Extensive review of the research project proposal also occurred during these trips. Refinement of goals, time frames and budgetary needs were developed when PIs from the Lead U.S. institution and the Host Country had the opportunity for the final face-to-face dialogue before implementation. Money transfer and audit considerations were also reviewed. In some cases it was possible to establish procedures which were mutually acceptable; in other cases, this process is still being developed.

In each case, it was clear that this additional opportunity for all concerned parties to meet at the Host Country research site at this critical stage greatly strengthened the collaborative spirit and reduced the communication problems which develop when mail is slow and telephone communication unreliable.

While appropriate documents were being reviewed and established in Host Countries, the principal documents (Subgrants and Subordinate Agreements) were being reviewed and signed at U.S. Lead Institutions. MO staff traveled to some institutions to assist with this process. As project proposals were approved, the MO processed requests to USAID for travel clearances and purchase approvals and waivers.

Publications from the MO during FY-81 include a CRSP brochure and the first issue of a Newsletter to be published regularly.

In August, the Women in International Development Specialist position was expanded from one-quarter time to three-quarters time. An expanded plan of work was developed, focusing on strengthening the involvement of women in the research process in the U.S. and Host Country, networking women scientists who are involved in related research projects at other institutions, and continuing to develop the Principal Investigators' awareness of Women in International Development issues as they relate to each particular project and Host Country. The 1981 version of this plan is included as Appendix C of this report. News items and publications which strengthen the WID component of the CRSP are shared with research scientists, as appropriate. Additionally, the specialist's experience and expertise in field research in developing countries is supporting research projects as they involve rural women.

PROJECT ANNUAL REPORTS: FY-81

Introduction

Initiation of the eighteen research projects identified in the CRSP Grant was among the first objectives adopted by the MO. The CRSP Board of Directors and MO staff agreed on the concept that no project activity should be undertaken with CRSP funds in the U.S. until such time as the project was ready for initiation in an identified Host Country. Furthermore, all participants, including Host Country governments and USAID Missions, would be involved in project development and committed to project proposals and budgets before any Subgrant to a U.S. Lead Institution would be established.

The process for project initiation included: 1) project proposal review by the CRSP Technical Committee (proposals written by U.S. Lead Institution Principal Investigator based on earlier discussions with Host Country Principal Investigator on site); 2) follow-up conference of the U.S. project teams with Host Country collaborators for review/revision of each proposal, and 3) final approval of the proposal by the CRSP Board of Directors. An additional requirement was that a Memorandum of Understanding was signed by an appropriate Host Country official, a Host Country research institution administrator, a USAID Mission representative and a Bean/Cowpea CRSP MO program staff member.

While the planning process had identified the projects, U.S. and Host Country institutions and project leaders, considerable administrative and technical detail remained to be completed. These tasks had been initiated for one project during 1980; by August-1981, CRSP teams had visited 10 countries to develop 15 projects. Twelve of these projects were established in the Lead Institutions during FY-81, three more awaited only final Host Country action to conclude the process.

Through pre-Subgrant project proposal development travel, both by Host Country personnel in the U.S. and by U.S. teams to Host Countries, strong contributions were made to the CRSP network.

In addition to completion of CRSP documents, pre-Subgrant travel was undertaken for the purpose of interviewing staff and graduate students for assignment to Host Country project research sites.

Review of Principal Investigator's annual reports reveals that in addition to the planned collaborative research, there is a spin-off of interaction among concerned scientists, some who are project participants, and some who are not, culminating in a greater focus on beans and cowpeas than was envisioned originally. A network of research practitioners is developing which will strengthen the scientific field in the United States and throughout the developing world.

Women scientists are involved in many of the Bean/Cowpea research projects. They are the Principal Investigators in two projects. They are co-investigators in four projects (one recently resigned from the collaborating university since the initiation of the project, and was replaced by a man). They are technicians in five projects; in some cases assigned 100% to the CRSP research. In others it is a part of their total responsibility. Women graduate assistants are involved in several of the projects.

In the Host Countries, a few women scientists have been involved as co-investigators. Some women students have also participated in project work. In Brazil, women scientists in the topic area have been identified, and will be used as consultants. Three women have already been nominated as trainees. Unfortunately one of these who matriculated at a U.S. university found the adjustment too difficult and returned home. Field activity is too recent to reflect implications of the research for women who are cultivators, processors and consumers of beans and cowpeas.

Training of Host Country scientists is an important component of each CRSP research project. Even in the planning stage of the projects, attention is given to identify candidates for advanced graduate training, or specific short term training appropriate for the research project. Several people from Host Countries are already in graduate school at the collaborating U.S. institutions in Masters and PhD degree programs. U.S. research scientists are also receiving training in language and socio-cultural aspects of the areas in which they will be working. Additionally, they are making preparation for the

field work and analysis they will be carrying out in the Host Country. Short term training in the U.S. for Host Country scientists in specific scientific techniques needed for research activities is planned. Details of these training arrangements can be found in the full text of the Principal Investigators' Annual Reports.

MO summaries from Principal Investigators' annual reports follow. The complete FY-81 annual reports as submitted by the Principal Investigators are included in Appendix D.

BRAZIL/UNIVERSITY OF WISCONSIN/BLISS

"Identification of Superior Bean-Rhizobia Combinations and Utilization in Cropping Systems Suitable to Small Farms in Brazil"

Principal Investigator: Dr. Fred A. Bliss
Department of Horticulture
University of Wisconsin-Madison

Co-Investigator: Dr. Frank Dazzo
Crop & Soil Science Department
Microbiology Department
Michigan State University

Principal Investigators, Brazil: Mr. Pedro Pereira
Centro Nacional de Pesquisa de Arroz e Feijao (CNPAF)
EMBRAPA, Goiania

Mr. Ricardo da Roche
(CNPAF)

Summary of progress:

Project planning and documents nearly complete in Brazil and the U.S.

Project not initiated in FY-1981.

Trainee for future graduate work has been identified.

One international trip was made to develop administrative and research plans.

BRAZIL/BOYCE THOMPSON INSTITUTE/ROBERTS

"Insect Pathogens in Cowpea Pest Management Systems for Developing Nations"

Principal Investigator: Dr. Donald W. Roberts
Insect Pathology Resource Center,
Boyce Thompson Institute for Plant Research

Co-Investigator: Dr. Richard Soper
USDA Insect Pathology Research Unit
Boyce Thompson Institute

Principal Investigator, Brazil: Dr. Almiro Blumenschein
Centro Nacional de Pesquisa de Arroz e Feijao (CNPAF)
EMBRAPA

Co-Investigators: Dr. Evani Ferreira
Entomologist, CNPAF

Dr. Gerson Pereira Rios
Plant Pathologist, CNPAF

Belmiro Pereira das Neves
Entomologist, CNPAF

Summary of Progress:

Project planning and documents completed in Brazil and the U.S.

Arrangements have been completed to establish the Insect Pathology Resource Center (Brazil) in CNPAF/EMBRAPA, Goiania.

Arrangements have been made to conduct surveys for cowpea pests in cowpea-growing regions in Brazil.

Equipment and facilities are in place for the establishment of an Empoasia colony at BTI.

BTI scientist prepared for long-term on-site assignment at CNPAF/EMBRAPA.

One Brazilian entomologist will work as trainee (counterpart) with on-site project scientist posted from BTI. He will later be nominated for PhD study.

(Summary continued on following page)

BRAZIL/BOYCE THOMPSON INSTITUTE/ROBERTS CONTINUED

Short-term training initiated for scientists at CNPAF (including one woman).

Training opportunity identified for non-Brazilian Latin American scientists as part of the program at CNPAF.

Two international CRSP Team trips were made to develop and complete administrative and research plans.

CAMEROON/UNIVERSITY OF GEORGIA/CHALFANT

"Pest Management Strategies for Optimizing Cowpea Yields in Cameroon"

Principal Investigator:	Dr. Richard B. Chalfant Department of Entomology and Fisheries Coastal Plain Station University of Georgia
Co-Investigators:	Dr. J.A.A. Renwick Boyce Thompson Institute
	Dr. P. Richard Hughes Boyce Thompson Institute
Principal Investigator, Cameroon:	Dr. J.P. Eckebil Institute of Agricultural Research Department of Agronomy and Forestry Research Yaounde, Cameroon
Co-Investigator:	To be named by IRA, Cameroon

Summary of progress:

Documents not yet signed by Cameroon government.

Entomologist, completing PhD at the University of Ibadan and IITA recruited and approved by HC government as long term researcher to be posted at Maroua when documentation is completed. (Expected to begin in early 1982).

An African and U.S. strain of cowpea weavil are in culture at BTI.

One international CRSP Team trip was made to develop administrative and research plans.

DOMINICAN REPUBLIC/UNIVERSITY OF NEBRASKA/COYNE

"Biology, Epidemiology, Genetics and Breeding for Resistance to Bacterial and Rust Pathogens of Beans (Phaseolus vulgaris L)"

Principal Investigator: Dr. Dermot P. Coyne
Department of Horticulture
University of Nebraska

Co-Investigators: Dr. Max L. Schuster
Department of Plant Pathology
University of Nebraska

Dr. James R. Steadman
Department of Plant Pathology
University of Nebraska

Principal Investigator, Dominican Republic: Dr. Cesar V. Paniagua
Secretaria de Estado de Agricultura

Summary of progress:

Project planning and documents completed in Dominican Republic and the U.S.

Varietal trials for blight tolerance have begun.

Pathogenicity of blighted samples being tested.

Experiments on survival of bean bacteria on bean debris under field conditions will be planned.

Implementation of a disease free seed program is being considered.

Dominican Republic candidate for graduate study returned to Dominican Republic; new candidates are being identified.

Three international CRSP Team trips have been made to develop and complete administrative and research plans.

DOMINICAN REPUBLIC/UNIVERSITY OF PUERTO RICO/LOPEZ-ROSA

"Improvement of Bean Production in the Dominican Republic Through Breeding for Multiple Disease Resistance in the Preferred Standard Cultivars"

Principal Investigator: Dr. Julio Lopez-Rosa
University of Puerto Rico
Mayaguez Institute of Tropical Agriculture (MITA)

Co-Investigator: Dr. George F. Freytag
USDA, SEA-AR, MITA

Principal Investigator,
Dominican Republic: Dr. Cesar Paniagua
Secretaria de Estado de Agricultura

Summary of progress:

Project planning and documents completed in Dominican Republic and the U.S.

New germ plasm tested.

Disease resistant populations identified and experiments initiated which would reduce time lag constraints.

Development of P. coccineus and recurrent selection populations proceeding.

Bacterial blight resistant breeding line XR-235-1-1 formally released.

Field trials on small farms in the Dominican Republic initiated.

Breeding program to transfer multiple disease resistance to standard Dominican Republic cultivars initiated.

One Dominican Republic scientist is enrolled in a master's program in the Department of Crop Protection, MPR, Mayaguez campus.

Two international CRSP Team trips were made to develop and complete administrative and research plans.

ECUADOR/CORNELL UNIVERSITY/WALLACE

"Agronomic, Sociological and Genetic Aspects of Bean Yield and Adaptation"

Principal Investigator: Dr. Donald H. Wallace
Department of Plant Breeding and Biochemistry
Cornell University

Co-Investigators: Dr. Patricia Garrett
Rural Sociology Department
Cornell University

Dr. Roger F. Sandsted
Vegetable Crops Department
Cornell University

Dr. H. Chris Wien
Vegetable Crops Department
Cornell University

Principal Investigator, Ecuador: Cesar Chiriboga
Institute Nacional de Investigaciones Agropecurias

Administrative Advisor: Patricia Espinosa
Institute Nacional de Investigaciones Agropecurias

Summary of progress:

Project planning and documents completed in Ecuador and the U.S.

Project adjusted to emphasize socioagronomic aspects of the research, in response to request from Ecuador.

Arrangements made that physiological genetics of bean maturity research applicable in Ecuador will be carried out by scientists stationed in CIAT and Guatemala.

Arrangements made for site selection and long term researchers to be assigned to site in FY-82.

One international CRSP Team trip was made to develop and complete adminsistrative and research plans.

GUATEMALA/CORNELL UNIVERSITY/WALLACE

Agronomic, Sociological and Genetic Aspects of Bean Yield and Adaptation"

Principal Investigator: Dr. Donald H. Wallace
Department of Plant Breeding and Biochemistry
Cornell University

Co-Investigators: Dr. Patricia Garrett
Rural Sociology Department
Cornell University

Dr. Roger F. Sandsted
Vegetable Crops Department
Cornell University

Dr. H. Chris Wien
Vegetable Crops Department
Cornell University

Principal Investigators, Guatemala: Porririo N. Masaya, Bean Program Leader
Instituto de Ciencia y Technologia Agucolas (ICTA)

Selvin Arreigo, Farming Systems Leader
Instituto de Ciencia y Technologia Agucolas (ICTA)

Summary of progress:

Project planning and documents completed in Guatemala and the U.S.

Research at Cornell on the effects of day length and temperature on beans has demonstrated that beans and other crop species with photoperiod sensitivity exhibit an optimal temperature for development toward flowering. The complexities of the physiological-genetics of photoperiod control of delays in flowering of beans have been demonstrated by the collaborating Principal Investigators. Guatemala has projects underway on breeding for early maturity for both moderate and high elevation locations. Further field research is planned at CIAT for variable elevations.

Guatemalan member of the socio-agronomic team of Guatemala's crop research organization has been nominated for graduate study in social science at Cornell.

A graduate student from Cornell will undertake the physiological-genetic studies at CIAT germane to the Guatemala crop environment.

Three international CRSP Team trips were made to develop and complete administrative and research plans.

HONDURAS/UNIVERSITY OF PUERTO RICO/LOPEZ-ROSA

"Improvement of Bean Production in Honduras Through Breeding for Multiple Disease Resistance"

Principal Investigator:
Dr. Julio Lopez-Rosa
Department of Crop Protection
University of Puerto Rico
Mayaguez Campus

Co-Investigators:
Dr. George F. Freytag
USDA, SEA-AR (MITA)
University of Puerto Rico
Mayaguez Campus

Dr. James S. Beaver
Department of Agronomy
University of Puerto Rico
Mayaguez Campus

Principal Investigators, Honduras:
Dr. Pablo E. Paz
Department of Agronomy
Escuela Agricola Panamericana

Dr. Mario Contreras
Department of Agronomy
Escuela Agricola Panamericana

Summary of progress:

Project planning and documents nearly complete in Honduras and the U.S.

Unique relationship of Escuela Agricola Panamericana (EAP) to Honduras has complicated documentation negotiations, as has establishment of research policy by EAP Board of Directors.

A positive collaborative relationship between EAP, the Ministry of Agriculture in Honduras, and the CRSP is anticipated.

Two international CRSP Team trips were made to develop administrative and research plans.

INCAP/WASHINGTON STATE UNIVERSITY/SWANSON

"Improved Biological Utilization and Availability of Dry Beans"

Principal Investigator:

Dr. Barry G. Swanson
Department of Food Science and Technology
Washington State University

Co-Investigators:

Dr. Elizabeth Varriano-Marsten
Department of Grain Science
Kansas State University

Dr. Donald Wood
Department of Agronomy
Colorado State University

Dr. George Hosfield
Department of Crop and Soil Sciences
Michigan State University

Dr. Mark A. Uebersax
Department of Food Science & Human Nutrition
Michigan State University

Dr. Julio Lopez-Rosa
Agricultural Experiment Station
University of Puerto Rico

Principal Investigator, INCAP:

Dr. Ricardo Bressani, Chief
Division of Agriculture and Food Science
Institute for Nutrition in Central America and Panama (INCAP)

Co-Investigators, INCAP:

Edgar Braham
INCAP

Luis Elias
INCAP

Mario Molina
INCAP

R. Gomez-Brenes
INCAP

(Summary continued on following page)

Summary of Progress:

Project planning and documents are nearly complete in Guatemala and the U.S.

Initial work has begun on the evaluation of analytical methodology for characterizing polyphenols, both hydrolyzable and condensed tannins, of dry beans. Preliminary experiments demonstrated that the procyanidin fraction of total polyphenolic compounds interacted with the proteins of dry beans.

Research has begun to establish analytical methods to determine the cause of the "hard-to-cook" phenomenon on dry beans. Preliminary research with protein isolation and purification techniques using affinity chromatography has been completed. Procedures are being established at Washington State University to study the in vitro digestability of dry bean proteins.

Genetic programs have been initiated to study the proteins developed in dry beans during seed development, and their relationship to inheritance of the "hard-to-cook" phenomenon in dry beans.

One international CRSP Team trip was made to develop administrative and research plans.

KENYA/UNIVERSITY OF CALIFORNIA-DAVIS/WEBSTER

"Improvement of Drought and Heat Tolerance of Disease Resistant Beans in Semi-Arid Regions of Kenya"

Principal Investigators:

Dr. Barbara D. Webster
Department of Agronomy and Range Science
University of California-Davis

Dr. J. Giles Waines
Department of Botany and Plant Science
University of California-Riverside

Co-Investigators:

Dr. Ken W. Foster
Department of Agronomy and Range Science
University of California-Davis

Dr. Anthony E. Hall
Department of Botany and Plant Science
University of California-Riverside

(Summary continued on following page)

KENYA/UNIVERSITY OF CALIFORNIA-DAVIS/WEBSTER CONTINUED

Principal Investigator,
Kenya: Dr. Daniel M. Mukunya
Department of Crop Science
Faculty of Agriculture
University of Nairobi
Kabete Campus

Co-Investigators: Dr. E.M. Gathuru

Dr. F. Itulya
Faculty of Agriculture
University of Nairobi
Kabete Campus

Summary of Progress:

Project planning and documents completed in Kenya and the U.S.

Site selected (Kutumani Drylands Research Station, Machakos District) for preliminary experimental work in Kenya.

Preparations made for UCD Research Associate to begin field data collection in Kenya.

Equipment purchases initiated.

Most promising Kenyan cultivar (Mweji Mojo) now growing in UCD where resistance to temperature stress and screening for abscission are being analyzed.

Preliminary analyses using Quantimet Image Analyzer undertaken at UC-Davis.

Tepary beans planted at UC-Riverside to assess drought tolerance, growth habit, disease resistance, salt tolerance and boron toxicity. Tepary seed increased for tests for diseases prevalent in Kenya. Selected teparies crossed with major Kenyan vulgaris lines and hybrid embryos cultured.

U.S. graduate student identified to participate in experimental work in Davis and Kenya.

Two international CRSP team trips have been made to develop and complete administrative research plans, including visit of Host Country Principal Investigator to Davis and Riverside facilities and field sites.

MALAWI/MICHIGAN STATE/ADAMS

"An Analysis of Genetic, Agro-Ecologic and Sociocultural Factors which Account for Persistent Patterns of Bean Land-Race Diversity in Malawi"

Principal Investigator: Dr. M. Wayne Adams
Department of Crop and Soil Science
Michigan State University

Co-Investigators: Dr. Pat Barnes-McConnell
Office of Women in International Development
Michigan State University

Dr. Julia Miller
Department of Human Ecology
Virginia State University

Principal Investigator, Malawi: Dr. Todo Edje
Department of Crop Production
Bunda College

Summary of progress:

Project planning and documents not yet completed in Malawi and the U.S.

Candidate for field assignment with the social science component identified.

U.S. graduate student working with bean research in U.S. sites and in language-training identified and awaiting field assignment with the agriculture component.

Malawi graduate student, FAO funded, enrolled in PhD program at MSU and collecting data on bean diseases in Malawi cooperating with CRSP Team.

No international person trips in FY-81 due to inability to secure Malawi clearance.

NIGERIA, IBADAN UNIVERSITY AND UNIVERSITY OF JOS/
MICHIGAN STATE UNIVERSITY/AKPOM

"Medical Problems Associated with Feeding Cowpeas to Children"

Principal Investigator:

Dr. C. Amechi Akpom
Department of Community Health Science
Michigan State University

Co-Investigators:

Dr. David S. Greenbaum
Department of Medicine
Michigan State University

Dr. Wanda Chenoweth
Department of Food Science & Human Nutrition
Michigan State University

Dr. Pericles Markakis
Department of Food Science & Human Nutrition
Michigan State University

Dr. Harold Sadoff
Department of Microbiology & Public Healtn
Michigan State University

Principal Investigators, Nigeria:

Dr. Ade Omolulu, Chairman
Department of Human Nutrition
Ibadan University

Dr. David Drew
Pediatrics Department
Faculty of Medicine
University of Jos

Co-Investigators, Nigeria:

Dr. Nicholas Okere, Acting Chairman,
Community Medicine
University of Jos

Dr. I.O. Akinyele
Department of Human Nutrition
Ibadan University

Dr. Heussein
Department of Human Nutrition
Ibadan University

(Summary continued on following page)

Summary of progress:

Project planning and documents completed in Nigeria and the U.S.

Plans refined to meet needs of host country.

Equipment purchases initiated.

Survey methodology was integrated with survey planned for the University of Nigeria, Nsukka and the University of Georgia study to combine data collection activities, and expand information base for both projects.

Training planned for Principal Investigator from Nigeria on specific analysis technique.

Two International CRSP Team trips were made to develop and complete administrative and research plans.

NIGERIA, UNIVERSITY OF NIGERIA, NSUKKA/UNIVERSITY OF GEORGIA/MCWATTERS

"Appropriate Technology for Cowpea Preservation and Processing and A Study of Its Socioeconomic Impact on Rural Populations in Nigeria"

Principal Investigator: Ms. Kay McWatters
Agricultural Research Scientist, Food Science
University of Georgia
Agricultural Experiment Station

Co-Investigators: Dr. Larry R. Beuchat

Dr. Manjeet S. Chhinnan

Dr. R. Dixon Phillips

Dr. Robert E. Worthington
Department of Food Science
University of Georgia
Agricultural Experiment Station

(Summary continued on following page)

NIGERIA, UNIV. OF NIGERIA, NSUKKA/UNIV. OF GEORGIA/MCWATTERS CONTINUED

Principal Investigator,
Nigeria: Dr. Patrick Obi Ngoddy
Department of Food and Home Sciences
University of Nigeria, Nsukka

Co-Investigators: Dr. George S. Ayernor

D.O. Nnanyelugo

Dr. Zak A. Obanu

Dr. I.C. Obizoba

Ms. Veronica I. Onuorah

Dr. N.D. Onwuka
Department of Food and Home Sciences
University of Nigeria, Nsukka

Dr. Azuka Dike
Department of Sociology/Anthropology
University of Nigeria, Nsukka

Summary of progress:

Project planning and documents completed in Nigeria and the U.S.

Preliminary development of survey instrument and survey methodology to determine socio-cultural and dietary factors initiated.

Survey methodology is being integrated with survey planned for Nsukka area, Ibadan area and Jos area to combine data collection activities, and to eventually reinforce information base of both GA/Nigeria and MSU/Nigeria projects.

Local sources in Nigeria have contributed N 40,000 ($72,000) to supplement the CRSP in addition to the University of Nigeria, Nsukka institutional contribution.

Two international CRSP Team trips were made to develop and complete administrative and research plans.

SENEGAL/UNIVERSITY OF CALIFORNIA-RIVERSIDE/HALL

"A Program to Develcp Improved Cowpea cultivars for Production and Utilization in Semi-arid Zones"

Princial Investigator:

Dr. Anthony E. Hall
Department of Botony and Plant Sciences
University of California, Riverside

Co-Investigators:

Dr. Ken W. Foster
Department of Agronomy and Range Sciences
University of California-Davis

Dr. Victoria Marcarian
Department of Plant Sciences
University of Arizona

Principal Investigator, Senegal:

Dr. M. Moodj, Director
Centre National de Recherches Agronomiques (CNRA), Bambey

Co-Investigators:

M. Diatta
Director du Departement d'Agronomie et de Bioclimatologie
CNRA, Bambey

M. Ndoye
CNRA, Bambey

C. Dancette
CNRA, Bambey

Summary of Progress:

Thirty advanced cowpea lines are being tested in Senegal and evaluated for drought resistance and yield potential at University of California, Riverside and Davis sites. University of Arizona evaluated a sprinkler gradient system for determining drought resistance .

Three cowpea strains have been identified, using a field method developed at University of California-Riverside, which appear to have superior heat tolerance to either Bambey, Senegal types or California Blackeye types.

A breeding project has been initiated at University of California-Davis to incorporate improved canopy structure and plant type.

Attention is being given to the development of cowpeas with improved resistance to fusarium wilt at University of California-Davis.

One international CRSP team trip was made to develop administrative and research plans. The project leader in Senegal visited all three collaborating campuses in the U.S.

TANZANIA/WASHINGTON STATE UNIVERSITY/SILBERNAGEL

"Breeding Beans for Disease and Insect Resistance and Determination of Economic Impact on Subsistence Farm Families"

Principal Investigator: Dr. M.J. Silbernagel
USDA, ARS, Research Plant Pathologist
Washington State University

Co-Investigator: Dr. Jean Due, Professor
Department of Agricultural Economics
University of Illinois

Principal Investigator, Tanzania: Dr. Bruno Ndunguru, Head
Department of Crop Science
Faculty of Agriculture, Forestry and Veterinary Science
University of Dar es Salaam
Morogoro, Tanzania

Summary of progress:

Project planning and documents completed in Tanzania and the U.S.

Socioeconomic baseline studies initiated and preliminary data analysis completed.

Local and exotic varieties of beans collected are being evaluated for pest resistance and agronomic characteristics at Morogoro.

African bean lines have been screened to identify sources of resistance best suited for initial hybridization at WSU (Prosser).

Tanzanian staff member from Morogoro has begun PhD studies at the University of Illinois.

Equipment purchases initiated.

One international CRSP Team trip was made to develop and complete administrative and research plans. Also, one Host Country Agricultural Economist visited University of Illinois to participate in setting up computer analysis of socioeconomic survey data.

_____ /COLORADO STATE UNIVERSITY/DEMOOY

"Semi-arid Cowpea Farming Systems"

Principal Investigator: Dr. C.J. deMooy
Department of Agronomy
Colorado State University
Fort Collins, Colorado

Summary of Progress:

The project in the Grant identified for C.S.U./deMooy was in Guyana. Subsequently, USAID/Guyana concluded it would not be possible for Guyana to participate effectively in the CRSP.

MO and CSU staffs have investigated alternative projects in Upper Volta and Botswana. USAID/Botswana solicited interest from the CRSP; this overature will culminate in a planning trip of MO and CSU personnel to Botswana in December, 1981.

Two international trips were made to IITA to discuss new project initiation.

BUDGET REPORT

Summary information on Bean/Cowpea CRSP finances during FY-81 are shown in Tables 1, 2, and 3.

Table 1 summarizes the allocation of USAID support to projects. Three groups of projects are identified:

a. those established in Lead Institutions during FY-81

b. those with project proposal and budget in order, but not established pending signature of some CRSP document either in Host Country or U.S.

c. those not yet initiated

Table 2 lists the contributions to total project budgets from USAID and U.S. Lead Institutions. Figures for Host Country contribution have not been accumulated in every case are, therefore, omitted from this report. However, they are substantial. MO expects the non-USAID component of project budgets to total nearly 50%.

Table 3 summarizes MO expenditures. Three categories were overspent: personnel, travel/per diem and other direct costs. These were offset by savings in other categories, even though MO budget was required to support pre-Subgrant project planning travel of project teams - an expense not originally anticipated.

FY-81 Bean/Cowpea CRSP Advance of Funds and Obligations

Project I.D.	Beginning Date	Date of Initial Advance	Amount of Initial Advance	Total Amount Obligated
	A. Executed Subgrant Details			
D. Rep/PR/Lopez-Rosa	06/01/81	06/04/81	$40,000.00	$92,350.00
Tanzania/WSU/Silbernagel	06/01/81	06/17/81	48,940.00	117,460.00
INCAP/WSU/Swanson	06/01/81	06/26/81	66,540.00	159,700.00
D. Rep/NE/Coyne	06/01/81	06/29/81	46,448.00	92,350.00
Senegal/UC-R/Hall	08/01/81	10/07/81	58,330.00	134,400.00
Kenya/UC-D/Webster	08/15/81	10/19/81	56,000.00	134,400.00
Guatemala/Cornell/Wallace[a]	08/15/81		37,190.00	89,250.00
Nigeria/GA/McWatters	09/01/81	09/28/81	32,000.00	67,200.00
Nigeria/MSU/Akpom[b]	09/01/81	09/23/81	32,000.00	67,200.00
Ecuador/Cornell/Wallace[a]	09/01/81		37,190.00	89,250.00
Brazil/BTI/Roberts[a]	09/15/81		34,960.00	83,900.00
TOTAL			$489,598.00	$1,127,460.00
	B. Pending Subgrant Details			
Brazil/WI/Bliss			$34,960.00	83,900.00
Cameroon/GA/Chalfant			52,500.00	126,000.00
Honduras/PR/Lopez-Rosa			21,040.00	$50,500.00
Malawi/MSU/Adams[b]			38,535.00	92,482.00
TOTAL			$147,035.00	$352,882.00
	C. Delayed Subgrant Details			
Brazil/WI/Hagedorn			$34,960.00	$83,900.00
CIAT/MSU/Adams			22,770.00	54,650.00
/CSU/deMooy			49,042.00	117,700.00
TOTAL			$106,772.00	$256,250.00
GRAND TOTAL			$743,405.00	$1,736,592.00

[a]Initial advances not applied for during FY-81.

[b]MSU projects do not require subgrants.

Table 2.
FY-81 U.S. Lead Institution Financial Commitment to CRSP Budgets (15 projects)

Country/ Institution	Total U.S. AID Contribution	U.S. Institution Contribution	% of Total Project to U.S. Inst. Contribution	Host Country Contrib.	Distribution of U.S. AID Contribution	
					U.S.	H.C.
INCAP/WSU	$159,700	$73,130	31%		$73,834	$85,782
Honduras/PR	50,500	20,075	28%		25,250	25,250
Guatemala/Cornell	89,250	27,871	24%		12,250	71,419
Brazil/WI (B)	83,900	11,617	12%		41,869	41,333
Brazil/WI (H)	83,900	26,809	24%		37,431	37,650
Brazil/BTI	83,900	29,704	26%		11,519	72,381
D. Rep./PR	92,350	31,168	25%		46,175	46,175
D. Rep./NE	92,350	48,320	34%		35,400	57,114
Senegal/UC-R	140,000	48,830	26%		61,835	78,165
Cameroon/GA	126,000	31,546	20%		42,786	83,215
Nigeria/MSU	67,200	31,542	32%		18,895	45,105
Nigeria/GA	67,200	21,333	24%		21,333	42,667
Kenya/UC-D	134,400	44,840	25%		44,800	89,600
Tanzania/WSU	117,460	63,682	35%		39,154	78,307
Malawi/MSU	92,482	12,928	12%		38,638	53,692
	$1,480,592	$523,395	26%		$551,169	$907,855

1. AID Contributions to project support (15 projects) = $1,480,592

2. Allocation of AID: H.C. = $907,855 (62.2%)
   U.S. = $551,169 (37.8%)

3. U.S. Institution Match Required: $\frac{\$551,169}{3}$ = $183,723

Match provided = $523,395 Excess Match = $339,672
Match provided = 2.85x match required

Table 3.
FY-81 Management Office Planned and Actual Expenditures

	Line Items	FY-81 Initial Budget	Actual Expenditures
1.	Personnel	$112,048.00	$119,881.00
2.	Equipment and Facilities	$37,377.00	$21,602.77
3.	Travel & Per Diem	$106,504.00	$129,939.84
4.	Technical Assistance	$20,765.00	$865.19
5.	Other Direct Costs	$13,236.00	$25,325.95
6.	Overhead	$115,514.00	$103,936.00
	TOTAL	$405,444.00	$401,550.25

MANAGEMENT OFFICE CONCLUSIONS

After more than two years of intensive planning, the Bean/Cowpea CRSP was implemented September 30, 1980. The planners had developed a global plan for CRSP research responsive to major constraints, and had identified the U.S. and Host Country researchers and institutions who would form the CRSP project research teams. Administrative organization of the CRSP had been conceived and incorporated in the Grant. All that remained was to establish the MO, conclude project plans, obtain formal commitments from all participants, and initiate the plans developed earlier.

PIs are enthusiastic with the working relationships developing among project collaborators in both the U.S. and Host Countries. Generally excellent cooperation has existed during pre-Subgrant project development meetings, typified by expressions such as "enthusiastic", "patient", "congenial", "effective", and "helpful". Host Country personnel often went far beyond professional expectations in accomodating the PI and MO representative.

In most cases the USAID missions were helpful beyond any required obligation. Continued contacts have permitted procedures responsive to the needs of both CRSP and missions to develop.

All participants have been eager for the projects to pass the start-up phase, and anticipate that project goals and objectives will be met as agreed upon. The MO staff is encouraged by the international community of professionals that is emerging from CRSP activities.

Inevitably, problems arose which were not anticipated - either by planners, principal investigators, institutional administrators, or management office staff.

Principal Investigators were asked to identify problems which were cause for concern. In retrospect, many of these seem unique to the initiation stage of project status, and probably will not recur. Others may be chronic, and may increase in frequency as more projects become operational and the pace of research activity increases in Host Countries.

It is the view of the MO staff that problems (and their frequency) observed to date are probably not representative of the long-term array. Nevertheless, a summary of the concerns reported by Principal Investigators follows:

Most frequently expressed concerns:

Physical communications difficulties between PIs in U.S. and Host Country.

Time delays in obtaining signatures on CRSP documents from Host Country Officials.

Administrative details in completing subordinate agreements between U.S. Lead Institutions and U.S. and Host Country Collaborating Institutions.

Identifying qualified Host Country candidates for graduate study in U.S. institutions.

Next most frequently expressed concerns:

Developing an appropriate mechanism for transfer of funds from U.S. Lead Institutions to Host Country Institutions.

Administrative work imposed on research scientists deters their research and training efforts.

Least frequently expressed concerns:

Too much money required to comply with the USAID/CRSP requirement for a high degree of accountability.

Restrictions and encumberances of excessive paper work creating an undue burden on complex tasks undertaken in distant countries.

Selection of the best possible site for field research in a Host Country very difficult.

Host Country not able to identify appropriate co-PI.

Importation of research equipment/vehicles to Host Country for use on CRSP project demanding and difficult to execute.

Establishment of a senior U.S. CRSP scientist in Host Country difficult.

Return of a Host Country graduate student who was unable to adjust to the U.S. system.

In addition, MO staff has identified some areas of concern from the perspective of involvement with many project teams at various levels, ranging from Host Country negotiations to work with administrative components of Lead Institutions. Discussions of four such concerns follow:

1. USAID Mission Directors and agricultural staff have been supportive of CRSP goals, research proposals and teams. One problem addressed in CRSP MOUs, but probably not resolved by that mechanism, is duty-free status for research equipment and vehicles to be provided to Host Country institutions for use on CRSP projects. It seems important to find means to include this component of CRSP activities in the Bilateral Agreements between USAID and Host

Countries. No other consideration of the Bilateral Agreement is as imperative to Bean/Cowpea CRSP projects, unless U.S. researchers on long-term assignment to Host Country project sites must be included in the mode which is part of the Agreement.

2. The CRSP philosophy includes the goal of obtaining commitments from eminent, senior U.S. scientists to engage in collaborative research with peers in Host Country institutions. The Bean/Cowpea CRSP organization provides that both technological and fiscal management of individual CRSP projects is assumed by the U.S. Lead Institution and Principal Investigator.

   This has created a considerable administrative burden on researchers (PIs) who are committed to a lead technological role, but who are not eager to assume a broad administrative burden.

   It is the position of the MO that the U.S. Lead Institutions should provide sufficient administrative support so that PIs can focus on research and provide overall project leadership with only nominal demands on them for routine administrative functions. Cost of such support can be borne by indirect cost levied by the Lead Institution against CRSP projects.

3. The CRSP has taken a position that the role of the U.S. senior scientist is to give experienced leadership and supervision to all facets of project implementation in close collaboration with the Host Country counterpart. In some cases this has meant the senior person will spend an extended period in the Host Country but in most cases the senior scientist will be travelling to the Host Country for shorter periods several times a year. Between visits he/she will supervise and make input by mail, telex or where possible by telephone. Travel budgets for this latter pattern reflect the anticipated collaborative activities.

4. The Bean/Cowpea CRSP experience has produced considerable insight into CRSP administrative matters, including development and execution of formal documents. MO is concerned that this experience and similar experience gained in other CRSPs should be made available to and utilized by recently created CRSP entities.

A strong beginning has been made on the excellent plan developed for the Bean/Cowpea CRSP. Amendments to the plan are anticipated, and will be developed through the joint efforts of PIs, the CRSP Board and Technical Committee and USAID staff, facilitated by the CRSP MO.

Assistance in identifying adjustments needed is expected from the External Review Panel which will meet in November, 1982.

Meanwhile, CRSP administrative entities will support projects in every possible way, including initiatives in socioeconomic evaluation and technical services. While both U.S. and Host Country institutions have made significant commitments to support CRSP research, the success of the CRSP is, and will continue to be, a function of continued support from USAID.

The Management Entity, Board, Technical Committee, and MO are confident that CRSP PIs and their collaborators in Host Country and U.S. institutions will achieve the objectives they have adopted, provided their efforts are supported in accord with the CRSP Grant.

Appendices

Appendix A

The Board of Directors of the Bean/Cowpea CRSP
Annual Report of the Chairperson

The past year was one in which the organizational structure of the CRSP was established, and the ground work for the research program developed.

The members of the Board of Directors were elected by representatives of the 10 participating institutions. The Board proceeded to formulate policy guidelines for the CRSP, and to act on recommendations prepared by the Technical Committee and the management staff.

A major accomplishment was the selection of the Director of the Management Office and the staffing of the total management team. The Program and participants are fortunate to have a group of highly qualified, competent and dedicated individuals providing the management functions together with the support of Michigan State University.

The Board reviewed 15 project proposals for final acceptance following review by the Technical Committee. Proposed Memoranda of Understanding with participating developing countries were also reviewed and suggestions of the Board were incorporated into the final documents.

Progress has been slow but steady, the first research projects are getting underway. Negotiations with many foreign governmental agencies and research centers have been time consuming and at times uncertain. Four Memoranda of Understanding have been signed, and others are in final stages of completion. A major factor in future success hinges upon the extent of commitment and cooperation of participants in the various countries.

The groundwork has been prepared, and the Board is confident that the dedication and competence of participating scientists from U.S. and abroad will overcome the difficulties of working on many projects in many countries.

The budget for the first year is adequate for the initial work proposed and a carry over should be available to supplement funds received during the second year. Concern is expressed about the outlook for the third year and beyond because USAID has indicated that budget cuts are likely to be made for collaborative research programs.

The Board has had the pleasure of participating in the implementation of the Bean/Cowpea CRSP. The total research program has great potential for contributing knowledge that leads to increased production and utilization of crops that serve as a major food source for many people of the world. The U.S., as well as countries abroad will benefit from this research. We look forward with anticipation to the continued development and growth of this Program.

J.F. Metz, Jr., Chairman
Board of Director
Bean/Cowpea CRSP

Appendix B

The Technical Committee of the Bean/Cowpea CRSP
Annual Report of the Chairperson

The Technical Committee of the Bean/Cowpea CRSP is charged to serve as the principal advisory group to the Management Entity on operational matters, functioning as an internal project review and research coordination panel. It is my pleasure to present the first annual report summarizing the major activities of the Committee in these regards.

The Committee, comprised of Jean Due, Wayne Adams, Donald Wallace, Larry Beuchat (Secretary) and Barbara Webster (Chair) reviewed and evaluated applications for the position of Program Coordinator and interviewed the most highly qualified candidates. Recommendations were presented to the Board of Directors and to the existing Management Entity. The Committee expressed its pleasure and approval at the selection of Dr. Donald Isleib for the position.

To enhance the global view of the Bean/Cowpea activities the Committee added to its membership a representative from CIAT (Aart van Schoonhoven) and one from a developing country - Azuka Dike (University of Nigeria, Nsukka), thus establishing its final complement of seven members. Designated as alternates to the Committee were Dermot Coyne, Donald Roberts, Kay McWatters, Peter Graham and Patrick Ngoddy. Terms of Committee membership were established at one year and two years to insure overlap and to enhance continuity.

The Committee reviewed collaborative research proposals as submitted to assure consonance of the work proposed with policies and guidelines of the Program, focussing particularly on the agreed-upon objectives and the professionalism of the project. In so doing, the Committee suggested procedural modifications to expedite and strengthen the review process and to enhance communication among PIs and the Management Entity. Working closely and diligently with the Coordinator and the Deputy Director of the CRSP, the Committee developed methodology to expedite review, revision, and approval of proposals submitted. Its relative success during the year in this regard can be gauged by the May, 1981, Management Office recommendation to the Board of Directors for final approval, or approval with proviso, of 12 projects Senegal - University of California, Riverside (Hall); Brazil - Boyce Thompson Insitute (Roberts); Tanzania - Washington State (Silbernagel); INCAP - Washington State (Swanson); Dominican Republic - University of Puerto Rico (Lopez-Rosa); Dominican Republic - University of Nebraska (Coyne); Nigeria - Michigan State (Akpom); Cameroon - University of Georgia (Chalfant); Nigeria - University of Georgia (McWatters); Kenya - University of California, Davis (Webster); Ecuador and Guatemala - Cornell (Wallace).

The Committee pursued interest in development of a state-of-the-art (SOTA) document for Beans/Cowpeas and in publication of an annual volume reflecting advances in grain legume science. Such documents are viewed as extremely important to the exchange of current information among principal investigators, collaborating scientists, and all other persons interested in research involving beans and cowpeas.

The Committee regularly received with gratitude current articles of special interest from the Women in Development Specialist (Nancy Axinn) and from the Deputy Director (Patricia Barnes-McConnell) in the Management Office. Some reports were designed to enhance sensitivity toward the involvement of women in the development process both as professional participants in and beneficiaries of Federal Programs. Others were articles of general interest and reports of specific pertinent programs in developing countries.

The Committee discussed and pursued initiation of additional research and other efforts deemed relevant to the achievement of CRSP goals. These ranged from formulation of new projects to workshop meetings of investigators at an international center.

Throughout the year the Technical Committee advised the Program Coordinator on technical matters pursuant to the discharge of management responsibilities. The Management Office actively and consistently sought the input of the Committee on matters appropriate to the change.

This summarizes briefly the major activities and accomplishments of the Technical Committee during the first year of its operation. However, it would be shortsighted indeed to conclude this report without mention of the excellent experience which Committee participation afforced its members, enhancing their knowledge of and sensitivity to the program and goals of the Bean/Cowpea CRSP. It would also be remiss to conclude this report without an expression of gratitute to those who laid the foundation for this program: Wayne Adams, Donald Wallace and Patricia Barnes-McConnell; to those from the Management Office who have expedited its implementation during the year: Donald Isleib, George Davies, Darlene Ashley, Kay Carter, and Nancy Axinn; to our USAID representative, John Yohe; and to Joseph Metz, Chair and to members of the Board of Directors for their concern and interest in the activities of the Committee.

Finally, on behalf of the Committee I express sincere thanks to the principal investigators of projects in this CRSP. Their constructive response to suggestions for strengthening their programs, their high level of enthusiasm, and their cooperation with the Committee have contributed in significant measure to the successes which the committee has achieved in the first year of its operation.

Respectfully submitted,

Barbara D. Webster
Chair, Bean/Cowpea CRSP, 1980-81

Appendix C

Bean/Cowpea CRSP Women-In-Development Specialist Plan of Work

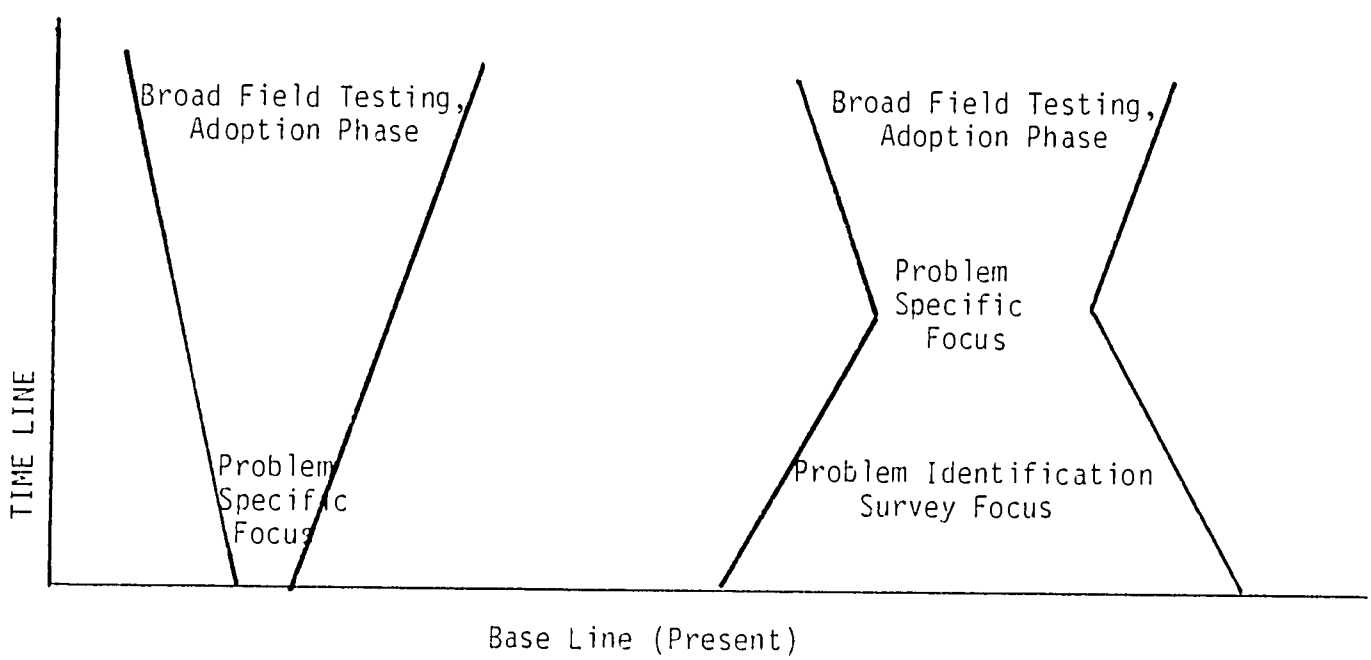
Nancy W. Axinn
June 9, 1981

The Women-in-Development position was created to support the Bean/Cowpea CRSP in addressing famine prevention and freedom from hunger in the developing countries of the world. This includes a specific focus on strengthening the individual projects, as they are developed to respond to the constraints identified in the production and utilization of food crops. It also implies recognizing that women can, and do, participate in the larger arena, as research scientists and technicians, as production agriculturalists, as food processors and as consumers.

It is proposed that the Women-in-Development Specialist develop programs to support the Bean/Cowpea CRSP efforts in the following four areas:

A. CRSP/WID Support to the Separate Research Projects. Appropriate to the type of research planned, support is given to individual projects.

1. Some research proposals involve women as producers, processors, and/or consumers from their inception. Others do not. Among this latter group are insect and disease research proposals which can be encouraged to involve women as researchers, technicians and trainees. Later, the implications of the research findings need to be evaluated in terms of their impact on the lives of women and families. This is an on-going concern of research focusing on bean/cowpea varieties and new agricultural practices. The diagram below illustrates the baseline of the two groups and projects the time line flow of their research endeavors over the years.



2. A WID assessment of each project, can identify the involvement of women as researchers, trainees, and technicians. It also focuses on the programmatic implications of the research, as the process and the findings will affect the lives of women and their families both at the research site, and in the broader context of famine prevention.

B. Program integration of the unique WID findings and implications of each separate research project. Project findings and implications must be integrated in a way which can support the growth and development of each other research project. This can build on the Global Plan, and strengthen the total Bean/Cowpea CRSP.

C. Develop ways to share WID related insights. As insights evolve from the total CRSP they need to be shared with the larger development and academic communities to maximize U.S. efforts to address famine prevention and freedom from hunger.

D. Document the Bean/Cowpea CRSP research process. Documentation, as it relates to women's involvement is a critical factor in the total program. It is important to document the extent to which various mixes of professional women and men scientists affect the outcome of research. This includes the variables of different disciplines, different locales and sites, different levels of involvement, and different positions in the research hierarchy as well as different sexes, in combinations as they exist in the CRSP. Baseline information can be collected, and the dynamics of attitude change, adjustment of research plans, etc. traced through the life of each project.

A matrix (attached) has been developed which illustrates some of the means by which A,B,C, and D can be accomplished. This matrix has become the work plan for a Women-in-Development Specialist. The WID Specialist is currently funded at one-quarter time. The matrix illustrates what is possible at a quarter-time level, and what would be possible at a full-time level, if funds were available.

While many of the activities identified in the matrix involve the WID Specialist in an educational role, there is additional need which includes participating in forward planning for years 3, 4, & 5 and beyond. Not included in the matrix are:

a. developing mechanisms for expanding the researchers' awareness (understanding) of the impact of their findings, and

b. developing mechanisms for involving researchers from different disciplines than those currently involved with the project.

		GOALS			
		A. WID Support To Each Separate Research Project	B. Integrate Separate Projects' WID Related Findings	C. Share WID Related Insights As They Evolve From Total CRSP	D. Document B/C CRSP Research Process As It Relates To WID
1.	Review quarterly PI reports, and follow-up	x	x	x	x
2.	Brief MO before project visits re WID at site	x			
3.	Review trip reports for WID focus, and follow-up	x	x	x	x
4.	Regular column in newsletter	x	x	x	
5.	Give WID related research methodology assistance (i.e. time and place gender sensitivity, etc.)	x			x
6.	Share insights from current WID related methodology	x			x
7.	Meet with PIs (TC mtgs)	x	x		x
8.	Encourage PIs to share WID Related findings	x		x	x
9.	Respond to requests for help in specific WID related areas	x			
10.	Site visits and follow-up support	x	x	x	x
11.	Seminar participation, professional publication		x	x	x
12.	Identify & utilize a WID research network relating to B/C	x		x	x
13.	Assist with development of forward planning for each research project	x	x		x
14.	Develop WID research plan for outside funding			x	x

1/4 TIME

Appendix D

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 1981
(to October 1981)

Principal Investigator: F. A. Bliss

Project Code: Brazil/Wisconsin/F. A. Bliss
(Country/Institution/Name of P.I.)

Date Subgrant received: —

Date Subordinate Agreements (if any) made with collaborating institutions (Copies should be attached): —

A. Progress to date: The project is not yet operationa. It is anticipated that it will become operational by November 15, 1981.

B. (1) Current problems:

Integration of the "microbiological" component into the overall project. There has been little agreement by the host-country personnel, principal investigators and the technical committee as to the problems this component should address.

C. Travel.

June 14-19, 1981 Travel to C.N.P.A.F. for participation in annual meeting of Brazilian nitrogen-fixation workers and to plan the current project.

D. Three Brazilian women research scientists are currently working in the host country on problems related to this project. While they are not located at C.N.P.A.F., their collaboration is anticipated to be an important facet of this project.

E. Participant training.

Mr. Pedro Pereira, currently the Host Country Principal Investigator has been identified for advanced degree training at the University of Wisconsin beginning fall, 1983. He will be supported by funds from Brazil rather than through # Bean/Cowpea CRSP funds.

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 1981

Principal Investigator: Donald W. Roberts

Project Code: Brazil/CNPAF/BTI/Roberts

Date Contract received: September 1, 1981

Date Subordinate Agreements (if any) made with collaborating institutions (Copies should be attached):

June 9 and 17, 1981

A. Summary of Over-all Progress

A pre-project development trip was conducted in March, 1981 to set up a general outline of how this and other Brazilian projects will interface with EMBRAPA (Empresa Brasileira de Pesquisa Agropecuaria). A subagreement between the research and specific research groups involved, namely Centro Nacional Pesquisa - Arroz e Feijão (CNPAF) and Boyce Thompson Institute (BTI) was signed in June. A Memorandum of Understanding (MOU) between EMBRAPA and Michigan State University (MSU) was prepared in three different versions and was finally signed by both parties in September, 1981. Two BTI scientists, Donald W. Roberts and Richard A. Daoust, visited Brazil in September to complete the arrangements for our working in Brazil. At this time the method for handling financial committments at CNPAF was decided. BTI was assigned to work in the very spacious Phytopathology section of the new CNPAF research facility. A survey trip to search for diseases of cowpea pest insects was organized for November, 1981. This will include Dr. R. Daoust of BTI and four CNPAF scientists. Activities at BTI on the Cornell campus included a very comprehensive literature search on pests and diseases of pests of cowpea and other legumes and we are in the process of obtaining many of these articles to be taken to Brazil. Equipment has been constructed to establish a leafhopper colony at BTI, and insects will be grown on a regular basis starting in October. Arrangements were made in Brazil for Dr. Daoust for housing and transportation during his September visit. He will continue the literature work at BTI and will select and order equipment for Brazil during early October and move with his family to Brazil near the end of October.

A member of the CNPAF staff has expressed interest in taking training in insect pathology and a number of other names have been proposed to us to contact.

Due to the fact that the project did not begin until after the middle of September, the above accomplishments only partially cover the objectives listed on page 8 of our grant application. However, significant progress was made:

a. Arrangements have been completed to establish the Insect Pathology Resource Center (Brazil) in CNPAF/EMBRAPA, Goiania.

b. Arrangements have been made to conduct surveys for cowpea pests in cowpea-growing regions in Brazil.

c. An Empoasca colony will soon be established at BTI. The equipment and facilities are in place now.

d. We have one identified trainee for the project and proposals for others have been made by CNPAF.

B. 1. Current Problems

The problems at present are those associated with virtually any overseas research, namely, the importation of equipment, the establishment of a senior scientist in a foreign country, etc.

2. Unusual Developments

The signing of the MOU proved to be very complicated and greatly delayed the initiation date of the project.

3. Favorable Aspects

The Brazilian scientists at CNPAF are very eager to have us participate in the research at their station. The facilities are new and a great deal of laboratory and office space will be available to our resident staff. The scientific environment is very good and we expect to develop good collaborative arrangements with our Brazilian counterparts.

C. Summary of Travel

March 21-28 Pre-Contract Project Development Travel
Participants: Drs. D.R. Isleib and D.W. Roberts
Destination: Brasilia and Goiania.
Purpose: To make arrangements for signing MOU and sub-agreement and to discuss details of our proposed project in Brazil.

September 15-25 Establishment of Details for Working in Brazil
Participants: Drs. D.W. Roberts and R.A. Daoust
Destination: Brasilia and Goiania
Purpose: To make arrangements for laboratory work, surveys for pathogens, identify training contacts (including women), and seek housing and transportation for R.A. Daoust.

D. Summary of Roles of Women

A woman in Brazil with strong potential as a trainee has been identified. We hope to eventually enter her in an advanced degree program, but CNPAF suggests that short-term training be done in the near future. A woman has been assigned to the project full-time in Ithaca to conduct Empoasca research, literature procurement, and assisting with such items as supply and equipment expediting to Brazil.

E. Training

Candidates Identified

Belmiro Neves, a CNPAF entomologist, will work with Richard A. Daoust until 1983 or 1984 when he is scheduled to begin a Ph.D. program. He is interested in biological control of insects and will probably do his dissertation on insect pathology. As mentioned under "D" above, at

least one short-term trainee has been identified. Several others are expected to be proposed within the next two months.

CNPAF is actively searching now for a candidate who they think would be appropriate to the insect pathology program and has already been authorized by EMBRAPA for advanced training. As soon as they identify such person or persons they will extend an invitation to them. BTI is seeking suggestions as to non-Brazilian Latin American scientists who may wish to receive training with our group at CNPAF.

F. Suggestions

We think we can trace some of our major difficulties in obtaining the necessary formal documents in Brazil to a failure in communication by the written word. Accordingly, we propose that requests sent to developing nations be stated very concisely and that letters of request be limited to the pertinent topic only.

G. Differences for FY-82 from the Project Proposal

The major differences from the proposed 1982 objectives are associated with the fact that the proposed objectives for 1981, although started in 1981, must be completed in 1982. A large part of our expenses proposed for 1981 were associated with establishing a laboratory overseas and establishing an American scientist there full-time. Even though the project did not start as early in 1981 as we anticipated, these fixed costs still exist and the money will have to be spent in 1982. Accordingly, it is our current estimate that the operating funds for FY-82 will require the amount originally assigned to 1981 and 1982.

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 1981
(to October 1981)

Principal Investigator: Richard B. Chalfant

Project Code; Cameroon, University of Georgia, Chalfant

Date Subgrant Received: Not received

Subordinate Agreements: Not made

Summary:

A. The Memorandum of Understanding and the Subagreement between the U.S. institution and Cameroon has been signed by the Director, USAID/Yaounde. DGRST and IPA have recommended that both documents be reviewed and approved by the Office of the Prime Minister. This was of June 22, 1981 and no status change has been reported.

Mr. Moffi Ta'Ama, an entomologist currently at the University of Ibadan in Nigeria was proposed as the researcher for the program in Maroua, Cameroon. As of Aug. 27, 1981 he was approved by DGRST.

An African and U.S. strain of cowpea weevil are in culture at Boyce Thompson Institute.

B. (1) Current problems: The MOU has not been signed by the appropriate official of the Prime Ministers Office of Cameroon as of September 22, 1981. There is no entomologist at the research site in Maroua, thus there is no true U.S. counterpart in the project.

C. Travel:

1. March 31 to April 11, 1980 to Cameroon in order to develop the project. Visits were made to Yaounde, the capitol and Maroua, where the research will occur. Information was obtained relative to research needs and the potential collaborators.

2. February 13 to Feb. 28, 1981 to Cameroon in order to receive the project with the host country and sign the MOU. Visist were made to Yaounde and the experiment station at Maroua. The format of the project was changed to fit USAID protocol. The project and MOU were then delivered to USAID/Yaounde for signature.

3. May 10 - May 15, 1981. To IITA at Ibadan, Nigeria to attend Cowpea Insect Workshop, interview candidates for entomologist position at Maroua, Cameroon, and develop liason with cooperators.

E. WID in US: Four women will be working part time on the project.

WID in Cameroon: Technicians and clericals have not been designated. Every attempt will be made to hire qualified women.

F. Nothing to report.

G. No change in 1982 budget.

Bean/Cowpea CRSP Report - Funding Year 1981
June 1 to Sept. 30, 1981)

Principal Investigator: Dr. Dermot P. Coyne, Department of Horticulture, University of Nebraska, Lincoln, Nebraska, 68583-0724.

Project Code: Dominican Republic/Secretaria de Estado de Agricultura/Dr. Cesar V. Paniagua.

A. Summary: Our project has been operational for four (June to Sept. 1981) months so at this time we are just getting our research initiated as described below.

(a) Varietal Adaptation Trials on Small Farms and Testing of Lines at an Experimental Station

During Drs. Cesar Paniagua and P. Vargas's visit to Lincoln, Nebraska, August 25-26, we assembled seed of 4 bean lines, which have shown resistance to common blight in Nebraska, for testing in trials on farmers fields at different elevations around San Juan de Maguana bean growing area, Dominican Republic. This is the main bean production area in the D.R. UPR and MITA, Puerto Rico, also provided lines to include in these tests. They also brought back part of this seed to Dr. George Freytag, UPR-MITA, our cooperator, for testing in 3 trials in Puerto Rico and 1 in Honduras. The Nebr. dry bean lines were EP-1 (Pinto), WM_2-79-12 (Pinto), GN Emerson, and Tepary. Seed of 10 other bean lines were also assembled for testing for common blight tolerance at the San Juan de Maguana Experiment Station. Six of these lines have shown tolerance to common blight in Nebraska and have been used in our breeding program. Bean lines growing on trials on the small farms and on the Experiment Station will be evaluated for reaction to common blight, rust, other pathogens and information will be recorded on general adaptation and performance during our next visit scheduled for November 15-21, 1981. This phase of the work is in accordance with the Addendum to our CRSP Research Project Proposal (I, 2a & 2b)

dated April 23, 1981

(b) Bacterial Blight Investigations - Epidemiology

(i) Bean seed and leaves collected by D.P. Coyne during his trip to D.R. on March 25-28, 1981 did not yield bacterial pathogens of beans. During his visit to Nebraska, August 25-26, 1981 Dr. Cesar Paniagua brought blight infected bean samples from D.R. Bacteria isolated from these samples were purified, and we are in the process of determining their pathogenicity. The reaction of germ plasm to these isolates will be investigated in order to idenfity sources of resistance/tolerance. More diseased leaf and seed samples will be collected during our trip Nov. 21-25. This objective is in accordance with the Addendum of our CRSP Research Project Proposal (I, 2c).

(ii) During Dr. Paniagua's visit, August 25-26, 1981, to Lincoln, Nebraska, Dr. Schuster and Dr. Paniagua planned experiments on survival of bean bacteria on bean debris under field conditions in the D.R. To facilitate survival studies, supplies and equipment were requisitioned for D.R. pathology laboratory. This phase of the research is in accordance with the Addendum of our CRSP Research Project Proposal April 23, 1981 (I, 2d).

(c) Clean Seed Program

Plans to develop a clean seed program will be discussed to possibly implement a disease free seed program during our next visit to the D.R. (Nov. 15-21, 1981). This is in accordance with the Addendum to our project, April 23, 1981 (I-2f).

(d) Rust

Initial samples of rust collected in the D.R. and mailed or hand carried to Lincoln have not retained their viability. Another collection (dried first before mailing) will be made by Dr. Paniagua. Seed assembled by CIAT for the international bean rust nursery has been sent to Dr. Paniagua for testing at two locations and two planting dates in the D.R. In addition, 10 cultivars with different rust reactions in the D.R. were sent to Paniagua for an observation nursery. These cultivars will give some information on horizontal rust reaction and will be further studied in the greenhouse at Nebraska. Rust nurseries will also be established in Puerto Rico in cooperation with Drs. Freytag and Lopez-Rosa. These objectives are in accordance with the Addendum to our CRSP Research Project (I, 2b and 2c), April 23, 1981.

B. (a) Current problems and (b) Unusual developments

(i) We were not successful in persuading Maritza Rosario Valdez to complete her intensive english language training at UNO. She missed her family, became very depressed, and returned to the Dominican Republic after only 1 month. We were disappointed that she did not remain in the US to complete her english and graduate programs as she is a talented person and would have been a great asset to the bean research program in the D.R. We have found it difficult to identify superior graduate student prospects durirg these early months but hope that with the assistance of Drs. Paniagua and Vargas that we will be able to identify two graduate student candidates to start them in english language programs next semester (Jan. 1982).

(ii) The amount of paper work involved for the working scientists is a detriment to the research and training effort. It also tends to lessen enthusiasm for the effort. A great waste of money is involved

in trying to attain a high degree of accountability. It is difficult enough to work in a distant country on complex problems without the added restrictions and encumbrances of excessive paper work!

(c) Favorable aspects

We have established a congenial and effective cooperative working relationship with Drs. Paniagua and Vargas. They have showed much enthusiasm for the project. In order to expedite the initiation of the project they flew in August to Nebraska to discuss the problem of the transfer of project funds to the D.R., the purchase and shipment of a vehicle, and plans for variety trials and other experiments. They brought back to the D.R. experimental seed samples for planting in Sept. at 5 locations in the D.R. Because of their visit we were able to quickly arrange for the transfer of funds to their S.E.A. and the purchase of a Malibu diesel station wagon for shipment to the D.R. during this Nov./Dec. for use in the project in the D.R. Also, the other Ministry of Agriculture and AID persons have been enthusiastic and helpful in promoting the Title XII effort.

C. Summary of Travel

(a) Drs. D.P. Coyne, PI, and Dr. J.R. Steadman, Univ. of Nebraska visited Drs. G. Villanueva and C. Paniagua, Dominican Republic, October, 1980 to discuss the state of bean research and problems in the D.R., needed research, and our joint cooperation in the D.R. We also visited MITA, Puerto Rico, to discuss our cooperation with UPR/MITA in the D.R. and our division of responsibilities in the D.R. This trip facilitated our ability to write the grant.

(b) Drs. D.P. Coyne, PI, and J.R. Steadman, University of Nebraska (UN) along with Dr. D.R. Isleib, Title XII Bean/Cowpea CRSP Management Office, Michigan State University, Dr. Julio Lopez Rosa, University of Puerto Rico (UPR) and George Freytag, USDA, MITA, Puerto Rico, visited the Dominican Republic, March 23-28, 1981 in order to discuss the total Bean CRSP

Project with Dr. G. Villanueva, Administrator, and Dr. C. Paniagua, PI, SEA, Dominican Republic. Cooperative procedures, budgeting and program plans, specifics and responsibilities were discussed. A graduate student, Maritza Rosario was identified as a suitable candidate to pursue studies for the MS degree at the University of Nebraska. UPR and UN investigators, and Dr. Isleib, met with AID officiers (Brian Rudert and Ken Ellis) to discuss Title XII Bean Project and general agricultural and some specific bean problems in the country. UPR and UN investigators also met to discuss cooperative aspects of their respective CRSP proposals in the D.R. UPR and UN representatives also met with Dr. Steve Temple, Plant Breeder, CIAT, to discuss cooperative interaction and also to inspect CIAT bean germ plasm disease nurseries. UN representatives also attended the PCCMCA meetings which were held during the period of our visit and met many bean research people from other Latin American countries.

(c) Drs. C. Paniagua and P. Vargas, D.R. visited Nebraska August, 25-28, 1981, to plan for transfer of funds, plan experiments, collect seed for immediate planting, and to make arrangements for the purchase and shipment of a Malibu diesel station wagon to D.R.

(d) James R. Steadman visited CSU Ft. Collins, Colorado to discuss bean rust resistance sources with Drs. Marcial Pastor-Corrales of CIAT and Howard Schwartz, former CIAT bean pathologist. The trip was taken Sept. 17 and 18 and also involved viewing an international bean nursery at Fort Collins.

D. Roles and Responsibilities of Women

The first graduate student we identified for training in the US was a woman, Gloria Maritza Rosario. However, she was not successful in attaining her academic goals because she missed her family, became depressed and returned home. We are in the process of identifying new students and we hope one of them will be female. There are three female technicians working on some phases of this project at the University of Nebraska. Facets of our work which affect women have been dealt with in the Addendum of our CRSP Project

E. Status of participant training:

We have no students at the present time. Our student from the Dominican Republic, Gloria Maritza Rosario, returned home in July after a month, without completing her english language training and MS degree program. We are presently seeking new prospective students in the D.R. with the help of Dr. C. Paniagua.

F. Information sharing

(a) Based on our experience with students from overseas, we feel they perform better if their families are allowed to accompany them during training and some financial allowances are made for family support.

G. Fy-82-D.R. Graduate Students versus Domestic Student Help

Since no graduate students or trainees from the D.R. have been identified yet, funds allocated for grad student stipends will need to be utilized by domestic (Nebraska) student help to initiate research on bean rust and common blight. If grad students are identified by Jan. 1, 1982, only funds identified from June, 1981 to Dec. 31, 1981 will need to be shifted to student or technical assistance.

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 1981
(to October 1981)

Principal Investigator: Julio H. López-Rosa

Project Code: Dominican Republic/University of Puerto Rico/López-Rosa
(Country/Institution/Name of P.I.)

Date Subgrant received: 1st June 1981

Subordinate Agreements: No subordinate agreements made

Summary

A. Progress.

New Germ Plasm. (Ref.: P.R. Work Plan - Obj. 1)

Seed harvested from the Isabela planting (January-April) of the 58 collections from Mexico and the 122 collections from Guatemala of new germ plasm from the Vakili-Freytag explorations of 1978, was cleaned, weighed and evaluated. Seed increase has been adequate to send one (1) pound samples of 25 of the Mexican collections and 46 of the Guatemalan collections to USDA's long-term seed storage facilities. Other collections had poor germination or were not adapted and thus will have to be planted again to obtain enough seed for long-term storage and evaluation. All Phaseolus coccineus and P. polyanthus collections will have to be planted in Adjuntas where temperatures are lower. Since these species are not adapted to the climate at Isabela they did not set seed. It is interesting to note that two teparies from Guatemala were highly susceptible to Xanthomonas blight. Incidence of seed-borne virus diseases was negligible. This suggests that there is no major risk of bringing in such diseases. Several Mexican lines with high seed number (9 to 10) per pod were found. This may be a valuable and useful trait for improving yields (most of our advanced lines have 6-8 ovules) if it is compatible with other characteristics within our lines. Also many lines showed resistance to the prevalent diseases, which were rust, angular leaf spot, powdery mildew, bacterial blight and some caused by viruses.

Development of disease resistant populations. (Ref.: P.R. Work Plan - Obj. 2)

Because we have on hand some outstanding germ plasm for rust and bacterial blight resistance we have temporarily suspended the development of RSP's by field crossing in order to concentrate our efforts on uniformly incorporating the rust and bacterial blight resistance into our advanced lines by manual crossing. A procedure was also adopted this year to gain a generation by modifying our work plan which calls for crosses in December and planting F_1's in the field in April. Instead, the crosses were made in March and April and F_1 increase was planted in the greenhouse in August and

September (because of excessive rainfall). In this way F_2's should be available a year ahead of time to plant in the field by December 1981 for selection for resistance to foliar diseases.

The crosses made for this purpose were: 13 selected lines from the Michigan State University cooperative program of improved plant type (and derived from MITA/UPR multiple disease resistant lines) and 5 of the improved standard cultivars from the Dominican Republic, all of which were crossed to 4 MITA/UPR donor lines, viz., B-190, a rust immune line, XR-235-1-1, a release highly resistant to bacterial blight, and W-117 and 2W-33-2, both multiple disease resistant white lines. Most crosses and reciprocals were successful. The F_1 seed has been planted in the greenhouse and most of these plants have begun to flower as of this date.

Plantings of F_3's for selection to bacterial blight were made on schedule (June 1981) in Fortuna. Many of these F_3's were derived from a cross between XR-235-1-1 (bacterial blight resistant) and B-190 (rust immune), as well as from crosses between the aforementioned lines and Dr. R. Wilkinson's (Cornell) advanced lines resistant to bacterial blight. Several F_2 lines (include snap bean crosses which are to be selected for bacterial blight resistance) received from Dr. Mark Bassett (Florida) are also included.

Inoculation of this material with Xanthomonas has been made twice. Blight symptoms are well developed in susceptible checks (B-190 and W-117). At this date the planting is in full pod and still flowering. Some lines are beginning to look exceptionally good. A number of selections is expected from this material. Plant growth has been exceedingly vigorous. Frequent separation of the vines between rains has been necessary to permit entry, even though the row spacing is one meter. This may be due to the good root systems which characterizes line XR-235.

Development of P. coccineus RSP. (Ref.: P.R. Work Plan - Obj. 3)

The inoculation of the 158 selections of P. coccineus, which were increased by rooting cuttings, has been completed for testing foliar resistance to two virulent strains of Xanthomonas. The plants with highest resistance were transplanted to the field in Adjuntas during July and August. Additional sets of these 158 selections have been tested for resistance to CPMV by inoculation and the majority were found to be resistant. The susceptible clones will be removed from the Adjuntas field crossing block. Only Bean Golden Mosaic Virus (BGMV) has yet to be tested by inoculation. This we expect to do in October as soon as sufficient inoculum can be produced in P. vulgaris.

Development and release of breeding lines. (Ref.: P.R. Work Plan - Obj. 4)

The formal release announcement of the bacterial blight resistant breeding line XR-235-1-1 was finally signed. It took over a year to make a formal presentation and obtain the required signatures from the three organizations involved in the development of this germ plasm release. The announcement is being sent to 272 bean scientists in our mailing list. Our cooperating scientists have already received seed.

Field trials for Dominican Republic. (Ref.: D.R. Work Plan - Obj. 1)

During the early visit of Dr. Paniagua to UPR (June 1981), discussions were held concerning the preparation of field trials for the Host Country. The area available per small farm was given as 200 m^2. It was therefore decided to use two replications of a split plot trial in which half of each test line would be handled according to the farmer's traditional planting system and the other half would receive the same treatment but with the addition of the recommended fertilizer applications. Nine sets of twenty test lines, which include the farmer's variety, local checks, CIAT lines, 4 Nebraska parentals and 9 MITA/UPR lines were planted in September in various sites in the San Juan de la Maguana area. We will expect to obtain information on the effect of planting systems, disease resistance and locations on yield and on the interaction of variety with these factors.

Breeding Program to transfer multiple disease resistance to standard D.R. cultivars. (Ref.: D.R. Work Plan - Obj. 2)

Preliminary crosses were made with 5 standard cultivars with 4 MITA/UPR donor lines (See Dev. of Resist. Pop., above). F_1's of these crosses are progressing satisfactorily in the greenhouse. F_2 seed is expected to be available for selection for this coming December plantings.

3.

(1) Current Problems.

The Host Country Co-PI has informed us that project funds transferred from the University of Puerto Rico to the special account ("Programas de Recursos Externos - SEA, Num. 01-0391504-4, Banco de Reservas de la República Dominicana"), in the Dominican Republic have not yet been made available for disbursement. Salaries of personnel hired as of 1st July, as well as other Project expenditures, have not been paid. In spite of these serious difficulties the moral of the group is very high and work has continued on schedule.

(2) Unusual Developments.

Ing. Guillermo Villanueva who was Director of Agricultural Research and with whom we conducted all Project planning for the Host Country was replaced by Dr. César López. The fruitful relationship initiated with the Department of Agricultural Research of the Secretaría de Estado de Agricultura and Ing. Villanueva is anticipated to continue through his successor.

(3) Favorable Aspects.

The Host Country Co-PI, Dr. César Paniagua, has been able to establish a smooth working relationship with personnel of the Secretaría de Estado de Agricultura and has recruited a group of three highly motivated young agronomists to initiate Project operations. Seven small farmers willing to have trials planted on their farms have been selected.

C. Travel.

1. Dominican Republic; 16-18 April 1980.

Drs. George F. Freytag and Julio H. López-Rosa travelled to Santo Domingo to establish formal contacts and to initiate discussions with authorities from the Secretaría de Estado de Agricultura (SEA) and from the Interamerican Institute for Agricultural Cooperation (IICA) towards development of a Dominican Republic/University of Puerto Rico Bean/Cowpea CRSP Project. A project proposal was drafted and submitted to MSU at the Bean/Cowpea CRSP Development Meeting on 28 April 1980.

2. Dominican Republic; 6-8 October 1980.

Dr. Julio H. López-Rosa was accompanied in this trip to Santo Domingo by Drs. M. W. Adams, D. Coyne, and J. Steadman, who attended the Annual Meeting of the Caribbean Division, American Phytopathological Society, held in San Juan, Puerto Rico, and visited with the Bean/Cowpea research personnel at UPR/MITA. Further discussions and negotiations towards development of the Puerto Rico and Nebraska Bean/Cowpea Projects for the Dominican Republic were held with SEA and IICA representatives. The AID Mission was also contacted. Additional information was obtained on this trip for preparation of the formal proposal.

3. Dominican Republic; 22-28 March 1981.

Drs. George F. Freytag and Julio H. López-Rosa held meetings in Santo Domingo with Drs. D. Coyne and J. Steadman (Univ. of Nebraska), Dr. D. Isleib (MSU) and representatives from SEA and IICA to further discuss plans for Bean/Cowpea Projects at UPR and UN. Sessions were also held with the AID Mission Agricultural Officer. Project plans were reviewed and many useful suggestions were incorporated. Visits were made to field stations and surrounding localities in major bean production areas. The PCCMCA meetings were attended and three papers on bean research at UPR/MITA were presented.

4. Puerto Rico; 25-27 February 1981.

Ing. Guillermo Villanueva travelled to Puerto Rico, at no expense to the CRSP Management Office nor to UPR, to help Drs. G. F. Freytag and J. H. López-Rosa prepare the response to the points raised by the Technical Committee on the DR/UPR Bean/Cowpea CRSP Project proposal.

5. Puerto Rico; 21-26 June 1981.

Dr. César Paniagua travelled to Puerto Rico for discussions related to initiation of Project operations in the Dominican Republic. Modifications of the work plan were agreed upon and incorporated. It was decided, that as long as transportation from in-country is not available, to concentrate operations in the general area of San Juan de la Maguana. This trip to Puerto Rico afforded Dr. Paniagua the opportunity to become familiar with the bean research facilities at MITA and at UPR in Mayaguez, and to visit the field stations where research is conducted.

6. Puerto Rico; 29-31 August 1981

Dr. César Paniagua and Ing. Polibio Vargas, Director of the Southern Agricultural Development Center (CESDA) of SEA visited Puerto Rico on the return from a trip to the University of Nebraska. They brought to Puerto Rico the Nebraska bean lines that are to be used in plantings in the Dominican Republic, Puerto Rico and Honduras. They also hand-carried the seed sets from Puerto Rico for the initial planting in the Dominican Republic. Project progress, both in Puerto Rico and the Host Country, was discusses and a modified and more realistic project budget for 1981-82 was developed. Dr. Paniagua and Ing. Vargas also had the opportunity to visit extensively with Ing. Miguel A. Martínez, the Project-sponsored student at the UPR, Mayaguez Campus.

D. Roles and Responsibilities of Women.

There are two women in the technical staff of the Project. Miss Mildred Zapata, Department of Crop Protection, UPR - Mayaguez Campus, is in charge of laboratory, greenhouse and field work related to evaluations for resistance to diseases. She is currently writing her M.S. Thesis in plant pathology and expects to complete the requirements for the degree in December 1981. The other individual is one of the three agronomists recruited in July 1981 to initiate Project activities in the Dominican Republic.

E. Status of Participant Training.

One candidate, Ing. Miguel Martínez, was identified at the early phase of development of the Project. Mr. Martínez was admitted to the Department of Crop Protection, UPR - Mayaguez Campus. He initiated his M.S. progran in August 1981. He is well adapted and is making good progress. Completion of the M.S. requirements is anticipated for May 1983.

F. Insight to Share with Colleagues in Other Projects.

Efficient telephone service is extremely useful, especially in the early stages of project implementation. It has been our experience that telephone communication with our Dominican counterparts has allowed us to make immediate contact to clarify matters and take steps to modify procedures or take action which has saved time and project monies.

Our experience in the Dominican Republic confirms the usefulness of a knowledge of the language and of an understanding of the culture of the Host Country.

G. Details for FY-82 Different from the Project Proposal.

The Project calls for the establishment of Project operations in three major bean production areas in the Dominican Republic, namely, San Juan de la Maguana, Santiago and Higuey. However, due to lack of experience of the field personnel and lack of in-country means of transportation for long distance travel (vehicle is to be acquired by the UN Project for use also

by personnel of UPR Project) the work plan had to be modified. Project operations are to be centered around the San Juan de la Maguana area, the most important bean district in the country. Sites are to be located in the San Juan Valley, in the highlands surrounding the valley and in the semi-arid irrigated district of Azua, south of San Juan de la Maguana.

The 1981-82 budget was revised and increased in response to the needs of the project, both in Puerto Rico and the Dominican Republic. These needs are created by the rising operation costs due to inflation and normal salary and wage increases. An increased awareness of the importance of frequent travel of UPR Project personnel to the Host Country and of having a project evaluation meeting are also reflected in the increased budget.

Increments in the Dominican Republic budget obey also to rising operational costs and the need of paying a higher portion of the salary of the Co-PI since he has now a full time responsibility for the Bean/Cowpea CRSP Projects (UPR and UN). Adjustment of the monthly stipend paid to the graduate student was made to put it in line with real costs and with the allowance for AID participants at the University of Puerto Rico - Mayaguez Campus.

Funds for the proposed increment in 1981-82 are to come from the unspent portion of the 1980-81 budget.

Other modifications to the work plan are mentioned and explained under Development of disease resistant populations (pp. 1-2).

(to October 1981)

Principal Investigator: D. H. Wallace

Project Code: Ecuador

Title: Agronomic, Sociological and Genetic Aspects of Bean Yield and Adaptation.

Institution: Instituto Nacional de Investigaciones Agropecuarias (INIAP)

Principal Investigator: Cesar Chiriboga

Date Subgrant received: October 1 or November 1, 1981

Date of Subordinate Agreements: None.

A. Summary of Progress. Progress has been made on the physiological genetics of bean maturity. This is reported in full in the Guatemalan report. See G. for changes in this objective.

B. Current Problems. To identify a post doctorate and graduate student. To acquire and analyze secondary data. To determine the Ecuadorian site at which this work will be conducted.

C. Summary of Travel. Pre grant planning trip to Ecuador in late March, early April by Wallace, Sandsted, Garrett. This travel was for planning. A post grant trip to Ecuador is planned for mid November, 1981, for Wallace and Sandsted.

D. Roles and Responsibilities of Women. Dr. Patricia Garrett of the Cornell Rural Sociology Department is responsible for the sociological aspects of this work.

G. Details for FY-82 different from the project proposal. During the March-April discussion with INIAP, the decision was made to fund the socio-agronomic aspects of this proposal. The genetic and physiological aspects were not funded for Ecuador. This latter work will be done in Guatemala and through Guatemalan and Cornell cooperation with CIAT. We intend to look after Ecuadorian interests in this area. The findings at Guatemala, CIAT and Cornell will generally be applicable in Ecuador.

The socio-agronomic approach is relatively new in Ecuador. We will rely to some extent upon the greater experience in this area of ICTA in Guatemala.

(to October 1981)

Principal Investigator: D. H. Wallace

Project Code: Guatemala

Title: Agronomic, Sociological and Genetic Aspects of Bean Yield and Adaptation.

Institution: Instituto de Ciencia y Technologia Agricolas (I.C.T.A.)

Principal Investigator: Porfiro N. Masaya

Date Subgrant received: September 1, 1980

Date of Subordinate Agreements: Mr. Paul Gniffke, a Ph.D. candidate at Cornell University, has been appointed to CIAT for two years, beginning about November 15, 1981. For his Ph.D. research, he will study the physiology and genetics of regulation of bean plant maturity by daylength and temperature, and its relevance to adaptation and yield of bean cultivars. D. H. Wallace, P. N. Masaya, and Paul Gniffke are probably the three most knowledgeable people in the bean research world relative to photoperiod and temperature effects on the maturity and development of beans. The phenomena under investigation have relevance to most crops. The objective is to determine on a worldwide basis how the variations of daylength and temperature achieve control of plant development, maturity and adaptation.

A. Summary of Progress.

Research at Cornell on the effects of daylength and temperature on beans has demonstrated the following features.

1. Beans and other crop species with photoperiod sensitivity exhibit an optimal temperature for development toward flowering. This optimum gives flowering in the minimal possible number of days. Temperatures lower than the optimum temperature delay flowering by a Q_{10} effect on rate of node initiation and also interact with the effect of daylength. Temperatures above the optimum temperature for development towards flowering delay flowering by accelerating the processes that give the photoperiod caused delay of flowering. Thus, they also interact with photoperiod on a Q_{10} basis.

2. The effect of photoperiod on flowering is virtually absent at the optimum temperature and is enlarged with the range of temperature deviation, both below and above, from the optimum temperature.

3. The aspect of temperature that has the largest influence on the photoperiod response of plants is the day/night difference in temperature. Maximization of the delay in flowering caused by photoperiod requires that the day/night difference in temperature also be maximized. Vice versa, a maximized temperature difference effect requires long daylength.

4. P. N. Masaya's Ph.D. thesis, plus the Master's thesis just completed by Paul Gniffke, demonstrate the following complexities of the physiological-genetics of photoperiod control of delays in flowering of beans. The segregation data for several crosses consistently demonstrate that two genes are controlling the segregation. A complication, however, is that the segregation ratio differs from planting to planting within a year and among the plantings of different years. The number of early non-delayed plants has by adequate statistical significance been demonstrated to be 1/16, 3/16, 5/16, 6/16, and 7/16 of the plants of the F_2 population. This variation occurs when the very same F_2 population is grown in repeated plantings. It demonstrates a sliding scale of dominance as controlled by the environment. The above data are all for field plantings where the F_1 of these same crosses was

always delayed, rather than early. When the same F_2 populations are grown in the growth chamber, the F_1 is early. That is, the dominance is reversed between the field and the growth chamber. In the growth chamber, the number of early segregates of the same F_2 has been observed to be 9/16 and 11/16. This same phenomenon has been partially defined for maturity segregates in barley.

5. Cultivars that are very insensitive to photoperiod become sensitive in the presence of a large day/night difference in temperature. Simultaneously, the sensitivity of sensitive cultivars is greatly enhanced.

6. Guatemala has projects underway on breeding of maturity for both moderate vation and high elevation locations. These are an integral part of this project.

7. A graduate student was appointed to obtain, assort, and evaluate secondary Guatemalan data. These data will become the baseline from which achievement for thi project will be measured.

B. Current problems (1). Gniffke will use the superior resources of CIAT to study the same genetic and temperature and photoperiod regulations of plant maturity under tropical environments. He will plant the parental and F_1 and F_2 populations in the fields at both Palmira (1000 meters) and Popayan (near 2000 meters). At both locations the populations will be grown under the natural 12 hr daylength, plus an extended 16 hr daylength achieved via Mazda lamps placed in the field.

From these crosses, Gniffke expects by single seed descent procedures to devel 100 or more homozygous populations representing each F_2 population. The 100 or so families will represent a random selection of the possible segregates of the F_2 popu lation. Because they will be advanced to the homozygous stage, it will be possible to evaluate the average time of flowering and maturity with only about 20 plants. Such populations will ultimately be grown in many parts of the world to ascertain the effects of the different genotypes on regulation of plant development, maturity, and adaptation.

(2) Unusual developments. The above descriptions of the responses of bean plar to variations of daylength and temperature constitute the most thorough investigatic of the maturity vs. photoperiod and temperature relationship thus far undertaken wit crop plants. The identification of an optimum temperature for development is unique The term and a clear concept of the phenomenon does not occur in the crop plant lite ture. Nevertheless, the research literature is replete with statements that cool te peratures delay flowering and that high temperatures also delay flowering. The lite ture is also replete with findings that high temperatures sometimes make flowering earlier (for insensitive cultivars), while for other (sensitive) cultivars, high temperatures make flowering later. These concepts promise to revolutionize the stud of photoperiod and temperature regulation in all crop plants. Elucidation of the floating dominance concept and of the reversal of dominance by certain environments is also revolutionary. These concepts are adequately demonstrated in the literature but are generally termed simply as instances of interaction between genes, i.e. epi Improved understanding of the effects of daylength and temperature on maturity and adaptation of beans and other crops will ultimately bring about more collaboration between breeders, because certain locations (environments) of the world have specia merit in terms of selecting consistently for these characteristics.

C. Summary of travel. No travel was undertaken on this project through September 1981. Travel is planned to Guatemala during November. Pre-subgrant project develop ment travel was done in March and August of 1981.

D. Roles and Responsibilities of Women. The principal investigator from Cornell for the sociological aspects of this project is a woman, Dr. Patricia Garrett. Also, the first graduate student nominated by Guatemala for study at Cornell is a woman. She will study in the area of social sciences. She has been a member of the socio-agronomic team of Guatemala's crop research organization (ICTA).

E. Training. Identification of the woman from Guatemala to study in the social science area, and the assignment of Paul Gniffke to CIAT to undertake the physiological-genetic studies represent accomplishments to date in this area.

BEAN/COWPEA REPORT FY-81
(to October 1981)

Principal Investigator: Julio Lopez-Rosa

Project Code: Honduras/University of Puerto Rico/Lopez-Rosa

i. Pre-subgrant development activities.

Drs. Lopez-Rosa, Freytag, and other members of the UPR CRSP project team drafted a project proposal to describe the collaborative research previously discussed with Drs. Paz and Cortreras of E.A.P.

The project proposal was reviewed by the CRSP Technical Committee and endorsed for review/revision with collaborators in Honduras.

Drs. Lopez-Rosa (UPR-P.I.) and Isleib (M.O.) conferred in Honduras with Steven Wingert, USAID/Honduras; and Drs. Simon Malo, Director, Pablo Paz, Head of Dept. of Agronomy, and Mario Contreras, plant pathologist of Escuela Agricola Americana to review and revise the project proposal, MOU, and subagreement for this project.

E.A.P. Director Malo reviewed the CRSP documents with E.A.P. Board Chairman Smith. Since the E.A.P. Board had not previously adopted policies governing establishment of research relationships, it was decided that such policies should be adopted before Director Malo entered into commitments between E.A.P. and organizations such as the Bean/Cowpea CRSP. This process was not completed before the end of FY-81.

There are several unique features of importance to the CRSP/E.A.P. relationship:

1. E.A.P. has no resources indentified for support of research. However, several E.A.P. staff are committed to research, including the Director.

2. E.A.P. is not a Honduras national institution.

3. The CRSP team has developed a MOU with the Secretario de Recourses Naturales confirming a cooperative relationship between the CRSP project at E.A.P. and the M.R.N.

ii. No technical activities have been undertaken except as the Dominican Republic/UPR/Lopez-Rosa project compliments the Honduras project.

iii. The Honduras project was budgeted at the lowest figure of any CRSP project.

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 1981
(to October 1981)

Principal Investigator: Barry G. Swanson

Project Code: Guatemala/INCAP/Ricardo Bressani

Date Subgrant received: 1 June, 1981

Date Subordinate Agreements (if any) made with collaborating institutions (Copies attached): 1 July, 1981 - University Puerto Rico; Colorado State University, Kansas State University, Michigan State University and INCAP.

A. Summary of over all progress

Initial work has begun on the evaluation of analytical methodology for characterizing polyphenols, both hydrolyzable and condensed tannins, of dry beans. Numerous modifications of the vanillin procedure for condensed tannins, and the Folen-Dennis procedure for total phenolics are currently being studied and assays conducted to determine their acceptance to the research program. Dr. Telek and Freytag, University Puerto Rico, have defined a method to study the polyphenol-protein interactions reacting standard proteins and dry bean proteins with the extracted polyphenols from dry beans. It was found that only the procyanidins, condensed tannins, reacted with the protein fractions in these experiments. The polyphenol-protein interactions were studied during soaking and cooking and the results enabled development of a quantitative method for the determination of protein binding polyphenols of dry beans.

Drs. Varianno-Marsten and Jackson, Kansas State University, stored dry black beans at high temperatures and relative humidities for short time periods and observed alterations in the cell wall and plasmallema of the dry beans. The structural changes did not affect the mode of water penetration into the beans, but do help explain the increased rate of electrolyte leakage from stored beans during soaking. It will be necessary to design additional experiments to establish analytical method to determine the cause of the "hard-to-cook" phenomenon in dry beans.

Preliminary research with protein isolation and purification techniques using affinitive chromatography has been completed. Condensed tannins solvent extraction and purification using LH20 chromatography is proceeding. Computer software for evaluation of condensed-tannin-protein interaction has been developed and recorded. Experimental procedures for analyzing condensed tannin-protein interaction has been developed.

Procedures are being established at Washington State University to study the *in vitro* digestibility of dry bean proteins. It will be necessary to establish standard procedures for enzyme hydrolysis and for evluation of the protein. Evaluation of bean protein will be carried out both as an *in vitro* enzyme hydrolysis and an apparent evaluation of protein quality using *in vivo* studies with *Tetrahymena*.

Drs. Donald Wood, Colorado State University, and Drs. George Hosfield, Michigan State University, have initiated genetic programs to study the proteins developed in dry beans during seed development, and the relationshi of inheritance to the "hard-to-cook" phenomenon in dry beans.

Twenty strains of dry beans favored by consumers in Latin America were grown during the summer of 1980 (Table 1). These strains differed in seed-coat color, seed characteristics, and agronomic traits and where evaluated for protein content, soaking characteristics and percentage of hard seed. The results of the screening test showed large differences among lines for the rate of water uptake (Table 2). In addition, inter-strain differences were noted for the percentage of hard seed after 48 hours soaking time (Table 2). Bean strains fell into one of two soaking categories (data not shown). Strains with few hardshell beans after 48 hours soaking reached a water uptake plateau for soaking after 12 hours, but strains with a significant amount of hard beans after 48 hours soaking never reached their water uptake plateau. The percentage of hard seed among genotypes ranged from 0 to 56% with red and brown seed strains apparently most affected. Protein content among strains range from 22.1% to 28.4% and soaked bean texture ranged from 408 Kg/100g to 1,034 Kg/100g. Simple correlation coefficients (Table 3) show no associations between percentage protein and texture and percentage hard seed defect may be associated with seed-coat pigments and tannin levels. Texture, however, appears to be independent of seed-coat color and tannin level.

Based on the 1980 results, 8 strains (Table 4) were selected for genetic analysis of soakability, cookability, hardshell development, and tannin content. In addition to the 8 strains the cultivars 'San Fernando' and 'Nep-2' were included because of their known cooking characteristics (Table 4). During the winter of 1980-81, the 10 strains were crossed in diallel (including reciprocals). The 90 F_1 crosses and 10 parents were grown in the field during the summer of 1981.

Seed from the 10 parents and F_1 crosses will be evaluated in the laboratory for the above characteristics. In addition, the F_2 seed produced on F_1 plants will be grown in the greenhouse to generate F_3 families for laboratory evaluations and genetic analysis.

The assessment of the role dry beans play in the diet of urban and rural populations of Guatemala has been studied briefly. A more complete assessment awaits the completion of administrative details and the successful signing of subordinate agreements with the collaborative institution, INCAP in Guatemala.

B. 1. Current problems

- administrative detail in completing subordinate agreements.

2. unusual developments - we have through the contacts provided by the Dry Bean/Cowpea CRSP administrative office developed a collaborative research arrangement with Julia Kornegay at CIAT and received samples of dry beans bred for leaf hopper resistance which may be of interest. We have agreed to plant and grow these dry beans and determine the polyphenolic content of the plant material and the seeds for both nutritional and phytochemical evaluation.

3. favorable aspects - all the principle investigators have been very patient and understanding, and are proceeding with research projects and experiments designed to answer some of the objectives and goals stated in the overall research project. I believe the experience gained in the past and the cooperative atmosphere will enable us to meet the objectives of the research proposal within budget restraints.

C. Summary of travel

1. March 23-29, 1980; Guatemala
The purpose of this trip was to attend a meeting (PCCMCA); to prepare USAID Dry Bean/Cowpea research proposal in conjunction with the Instituto Nutricion Central American and Panama (INCAP) and to discuss nutritional evaluation research with scientists at INCAP.

2. December 6-14, 1980; Guatemala.
The purpose of the trip was to revise and evaluate the Dry bean/Cowpea CRSP proposal with scientists at INCAP; to discuss the administrative procedures in establishing a subordinate agreement with INCAP; and to gain experience with the way in which dry beans are produced, stored and used by the rural population of Guatemala.

D. The Co-investigator at Kansas State University during the first period of this project was Elizabeth Varrano-Marsten. She conducted research on the "hard-to-cook" phenomenon in dry beans and has published a paper entitled "Hard-to-cook phenomenon in beans: structural changes during storage and imbibition" (JFS 46,1379). I have initiated cooperative research with a Ms. Julia Kornegay, visiting Research Associate, CIAT, Colombia. It is my understanding that the position which Dr. Variano-Marsten has given up at Kansas State University will be continued by a woman. Because we have not been in close contact with the research and planning in Guatemala recently, I am not able to address the roles and responsibilities of women in the host country at the present time. The *in vitro* digestibility and *Tetrahymena* research at Washington State University will be conducted by a woman graduate student, Tak-Ling Aw, who is supported by the Nutritional Quality Evaluation Lab (NQEL) at Washington State University.

E. We have not identified candidates for training in this project at the present time. I have included Mr. William E. Artz, as a research assistant at Washington State University, but have not received word about any candidates for training either at Washington State University or other institutions in the United States, or of candidates for training in Guatemala at INCAP.

F. Information/suggestion/insights: It is apparent to me that a great deal of patience is necessary to establish subordinate agreements and financial arrangements with institutions inside and outside of the United States. It

is most important to be open-rinded and keep lines of communication open so that suggestions, ideas and changes can be incorporated into ongoing research at any time.

G. Details for FY-82 different from proposal - I will include with this report a proposed budget for FY-82. I would hope that the subordinate agreements could be completed within this fiscal year, that the objectives stated in the initial proposal for year 1 and year 2 can be accomplished, and that more detailed results could be presented within the next year.

TABLE 1. Pedigree seed coat characteristics, and source of 20 strains of dry beans.

STRAIN NO.	PEDIGREE	SEED COAT COLOR	SOURCE
V_1	F-F-17-4-4-M-M-M	Brown	CIAT
V_2	BRASIL 2 Bico de ORO	Beige	CIAT
V_3	F F 12-13-1	Red	CIAT
V_4	F F 16-15-1-CM-M-M	Red	CIAT
V_5	A 5	Brown	CIAT
V_6	G-1,000	Dark Brown	CIAT
V_7	15-R-148	Red	University of Wisconsin
V_8	A 35	Brown-Beige mottle	CIAT
V_9	A 30	Glossy beige	CIAT
V_{10}	F F 16-3-1-M-M-M	Yellow	CIAT
V_{11}	F F 16-10-1-CM-M-M	Red	CIAT
V_{12}	F F 16-26-13	Brown	CIAT
V_{13}	BRASIL 2	Beige	CIAT
V_{14}	P 766	Dark Brown	CIAT
V_{15}	P I 196299	Red	Washington State University
V_{16}	P I 196936	Yellow	Washington State University
V_{17}	62267	Dark Brown	Michigan State University
V_{18}	Black Turtle Soup	Black	Michigan State University
V_{19}	Sanilac	White	Michigan State University
V_{20}	790524	Beige	Michigan State University

Table 2. Percent water uptake at 20C and eight time intervals, percent hard seed, protein content, and soaked bean texture for 20 strains of dry beans.

Strain	Seed Coat Color	Soaking Interval (Hrs.) 2	4	8	12	20	28	48	After 48 Hrs.	Protein	Texture
		Water Uptake %							%	%	Kg/100g
v_1	Brown	22.9	39.5	55.8	65.2	75.4	88.5	104.4	16.4	26.5	870
v_2	Beige	3.0	9.7	34.4	71.9	100.3	110.8	115.3	3.6	22.1	510
v_3	Red	2.3	4.7	10.3	20.0	35.2	54.3	96.3	24.2	28.4	972
v_4	Red	3.4	4.2	8.5	11.9	29.1	70.0	110.6	5.9	26.2	993
v_5	Brown	23.6	30.2	53.8	72.3	93.8	103.4	111.6	13.0	27.0	510
v_6	Dark Brown	40.8	55.3	86.3	101.7	110.8	111.2	111.2	0.0	26.4	680
v_7	Red	1.4	3.3	3.3	5.0	15.7	45.7	94.6	24.6	27.8	870
v_8	Brown Beige Mottle	22.9	30.8	48.0	60.6	81.5	86.3	97.2	22.5	26.1	986
v_9	Glossy Beige	4.4	9.8	17.2	20.6	36.0	41.5	50.8	56.4	22.3	1,034
v_{10}	Yellow	27.1	46.1	57.3	67.0	88.9	93.2	112.0	7.8	25.2	483
v_{11}	Red	64.1	104.1	132.0	134.3	135.3	139.2	141.5	1.1	25.5	537

Table 2 Continued

v_{12}	Brown	24.1	64.2	98.4	112.5	118.9	122.6	123.0	0.0	25.3	462
v_{13}	Beige	0.8	5.0	25.2	65.3	100.7	11..1	115.0	0.0	23.3	510
v_{14}	Dark Brown	2.3	3.1	3.8	12.7	49.8	79.2	105.0	3.8	25.3	619
v_{15}	Red	2.4	3.9	6.8	11.6	33.4	63.8	112.5	10.3	28.3	456
v_{16}	Yellow	10.5	15.5	34.0	48.7	78.8	8[illegible].7	102.2	12.3	24.5	408
v_{17}	Dark Brown	1.6	4.1	13.0	34.6	96.1	10..3	105.7	0.0	23.7	564
v_{18}	Black	4.6	27.9	65.7	86.8	106.8	11..3	116.0	0.0	25.0	605
v_{19}	White	73.2	105.9	114.0	114.0	114.0	11..0	114.0	0.0	27.9	665
v_{20}	Beige	13.8	25.5	40.1	49.2	83.4	9[illegible].0	106.6	7.7	25.3	537

Table 3. Simple correlations among protein content, texture, and percentage hard seed in 20 strains of dry beans.

Correlation	Correlation coefficient (r)
Protein vs Texture	0.196
Hard Seed vs Protein	0.050
Hard Seed vs Texture	0.293

TABLE 4. Pedigree, seed coat characteristics, and source of 10 strains of dry beans crossed in diallel during 1980.

STRAIN † NO.	PEDIGREE	SEED COAT COLOR	SOURCE
v-2	Brasil 2 Bico de ORO	Brown	CIAT
v-3	F F 12-13-1	Red	CIAT
v-4	F F 16-15-1-CM-M-M	Red	CIAT
v-7	15-R-148	Red	University of Wisconsin
v-8	A 35	Brown-Beige mottle	CIAT
v-9	A 30	Glossy Beige	CIAT
v-18	Black Turtle Soup	Black	Michigan State University
v-19	Sanilac	White	Michigan State University
v-21	San Fernando	Black	Michigan State University
v-22	Nep-2	White	Michigan State University

† Sanilac and Black Turtle Soup = Control strains.

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 1981
(to October 1981)

Principal Investigator: Barbara D. Webster

Project Code: U.S. University of California, Davis / Barbara D. Webster
(Country/Institution/Name of P.I.)

Date Subgrant received: September 1981

Date Subordinate Agreements (if any) made with collaborating institutions (Copies should be attached):

Please include the following in your summary:

A. Summary of over all progress, including results obtained to date, and a comparison of actual accomplishments with proposed goals/objectives for the period. (Please refer to project proposal.)

B. Indicate and explain: (1) current problems, (2) unusual developments (3) favorable aspects.

C. Summary of travel involved in the project (dates and destinations) through September 30, 1981 (including pre-Subgrant project development travel).

D. Summary of roles and responsibilities of women (U.S. and Host Country) technically involved in the project. Please also include project facets which have addressed women's work in Host Country related to beans/cowpeas during FY 81.

E. Status of participant training in your project at this time:
   Candidates identified:
   Candidates now in training:
      Where studying/training
      Level of program

F. Information/suggestions/insights gained to share with colleagues in other projects.

G. Details for FY-82 different from the project proposal, i.e. program or budget adjustments. (Project review at end of FY 82 will be based on this documentation.)

Project roster attached to be completed and returned with this report

A: Summary of progress

1) Memorandum of Understanding and Subagreement signed by all appropriate entities.
2) U.S. and H.C. co-investigators designed:
   U.S.: Ken W. Foster, Anthony E. Hall
   H.C.: E. M. Gathuru, D. M. Mukunya, F. Itulya
3) H.C. consultant identified: C. Caulson
4) Site for preliminary experimental work in H.C. selected: Katumani Drylands Research Station, Machakos District
5) Consultative relationship with AID-Kenya scientist established: Ian Stewart, Agrometerologist
6) Experimental site visited (twice) and arrangements for field plots finalized with the station director (Albert Marimi)
7) Budget negotiated and finalized by personnel at U. Nairobi and U.C. Davis
8) Budget allocations finalized for distribution to collaborators in the U.S. (Giles Waines) and principal collaborator in H.C. (Daniel Mukunya)
9) Proposal for research program reviewed and finalized
10) H.C. principal collaborator visit to U.C. Davis and U.C. Riverside
11) Staff research assistant hired, to be based at U.C. Davis (Donald Lotter)
12) Preparations finalized for UCD research associate to collect data on first experiment in the field in Kenya in Fall, 1981
13) Seed of most promising Kenyan cultivar (Mweji mojo) grown at Davis and data on growth and development, yield, and problems collected
14) Camera and appropriate lenses and filters for pictorial field records purchased.
15) Preliminary analyses using Quantimet Image analyzer at UCD undertaken
16) Plantings of tepary beans at UC Riverside
17) Lectures presented at UC Davis on the Title XII program and on the research project
18) Collaborative relationships established between H.C. scientists and scientists at CIAT and U. Washington (Tanzanian project) established
19) Preliminary screening trial on Kenyan cultivar (Mweji mojo) for resistance to temperature stress and for abscission carried out in greenhouse at U.C. Davis
20) Preliminary request and application made for other promising germplasm of Kenyan cultivars

NB--All first year objectives were addressed and were accomplished in whole or in part. The only parts not carried out were establishment of collaborative relationship between UCD scientists and those on the Malawi project (the project is just now underway), and the identification of a Kenyan student for training in the U.S. (one student, Julius Nyabundi, arrived at UC Davis from Kenya prior to the availability of project funds; it is not clear whether he is designated to receive project support eventually).

B. 1) Current problems

Uncertainty of amount of future funding and frequent changes in budget
Lag time in obtaining grermplasm from Kenya
Uncertainty of U. Nairobi accountability procedures
Overwhelming amount of paperwork connected with project initiation
Uncertainty about the extent of responsibility of the U.S. PI for expenditures, requisitions and procedures related to the project in Kenya
Frustration at relative infrequency of meetings of principal researchers, collaborators and consultants

2) Unusual developments

Arrival of the principal Kenyan collaborator in Davis--penniless
Realization of the lack of knowledge of the Davis and Riverside components of the project on the part of the Kenyan collaborator
Change in the roster of Kenyan collaborators
Strong suggestions for change of principal research site by Kenyan collaborator from Katumani to an undeveloped site at Kibweze
Budget haggling

3) Favorable aspects

Excellent director of Katumani Research Station
Excellent US-AID resource person (Stewart)
Excellent cooperation between MO and UC Davis administration and PI
Ambitious and hardworking research associate (Lotter)
Very good working relationship developed between UC Davis PI (Webster) and cooperator at UC Riverside (Waines)
Excellent support staff in management entity
General attitude of all involved people of supportiveness and encouragement
John Yohe
Superb work of members of the Technical Committee in expediting final review of the project

C. Summary of Travel

1980 (March) Preliminary visit to U. Nairobi by Webster and Waines to meet Kenyan collaborators, to visit prospective experimental sites, to meet US-AID personnel, to visit Thika and Muguga to discuss possible interactions

1981 (June) Visit to Nairobi to discuss budget, finalize project, visit Ministry of Agriculture, determine final experimental site, interact with US-AID personnel, seek signatures for Memorandum of Understanding and Subagreement

D. Roles of Women

U.S. PI is female, and will coordinate and direct project
Contacts established with Maendelao na Wanawake in Kenya
Contact established with Kenyan director of the Peace Corps (Serah Lukalo)
No project facets have yet explored the roles of women in relation to the subject of this research project

E. Participant Training

Candidate identified: Donald Lotter
Candidate in training: auditing relevant appropriate courses at UC Davis
Level of program: Ph.D. (Lotter will eventually become a formal Ph.D. student)

E. Information and Insights

It came as a shock to realize how little the principal Kenyan collaborator knew about U.S. (Californian) agronomic practices related to growing beans. Just as we have made a conscientious effort to familiarize ourselves with Kenyan nodus operandi in bean culture, so we should make as great an effort to familiarize our counterparts with the ways in which we grow, handle and use beans in the U.S.

It was also a shock to discover how much time can be consumed in budget negotiations. It's a good thing I didn't have any per ption at the outset of what was to come.....

It has been extremely gratifying to have had the great encouragement and cooperation from the Management Office; it sustains me in my hours of need

G. F-82 Project Proposal

The Project has remained essentially the same for F-82. If budget cuts do develop, information will be forthcoming and attached as supplement to this report.

Barbara D. Webster
November 13, 1981

Bean/COWPEA CRSP REPORT - FUNDING YEAR 1981
(to October 1981)

Principal Investigator: M.W. Adams

Project Code: Malawi/Bunda College/Edje

Date Contract received: _____

Date Subordinate Agreements (if any) made with collaborating institutions (Copies should be attached): _____

A. Summary of progress.

1. General

Project proposal based on prior collaborative talks was developed and distributed to Host Country colleagues.

2. Social Science component.

a. Collaborative arrangement discussed with participating U.S. institution (Virginia State University).

b. Potential candidates for field assignment in Malawi were interviewed.

c. Person to be assigned was identified (Julia Miller).

3. Agricultural component.

a. Interested and appropriate candidates were contacted for assignments to Malawi project. Group under review.

b. One M.S. candidate chosen (Greg Martin).

(1) Is presently working with bean research in the U.S. sites.

(2) Is studying Chichewa, the principal indigenous language of Malawi, formally and with a Malawi Student at MSU.

c. Malawi student at MSU on FAO funds (Wilson Msuku) corrdinating his work with the CRSP project.

(1) Planning trip to Malawi for three months in December to collect data and samples of bean diseases in Malawi.

(2) Will be working with the CRSP research team at MSU.

4. All of the above have been completed despite the delay in project start up.

B. State of the project.

Despite vigorous attempts to the contrary, this project has been slow to become established because of the repeated difficulties of getting permission to travel in Malawi at the specific times that all three of the researchers could travel to the sites. Because of the complexity of this multidisciplinary study, the researchers are concerned that both the agricultural and the social science planners work closely together with each other and their Host Country counterparts in the final designation of variables to be addressed, field sites chosen, methodologies, etc. This trip had to be cancelled twice and ultimately was not held in FY-81. All documents were in the hands of the Host Country persons for review and the year ended with the travellers again prepared to make the journey.

C. Travel.

The Principal Investigator and Co-Investigator (breeder and social scientist) work at the same institution therefore paid travel was not needed for the numberous planning meetings held. A second Co-Principal Investigator was identified at Virginia State University on a three day visit to that University by Barnes-McConnell in mid-May, 1981. No other travel for this project took place during the year.

D. Women in International Development (WID).

1. The two Co-Principal Investigators of this project are both professional women with prior experience and training appropriate to this project.

2. Project plans developed during FY-81 include substantive concern for the roles and concerns of women as the major bean producers in Malawi.

3. Female surveyors will be identified from Bunda College to assist in data gathering.

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 198[illegible]

Principal Investigator: C. Amechi Akpom, M.D.

Project Code: NIGERIA/MSU/AKPOM
(Country/Institution/Name of P.I.)

Date Subgrant received: September 1, 1981

Date Subordinate Agreements (if any) made with collaborating institutions (Copies should be attached):

August 31, 1981

BEAN/COWPEA CRSP REPORT
Funding Year 1981
(to October 1981)

(A) Summary of Overall Progress

Joint planning of the research project which was started during the first visit in 1980 was continued during the year with which this report is concerned. Such joint planning involved both the host country and M.S.U. investigators as well as the Deputy Director of the Bean/Cowpea CRSP Management Office, and was held in Nigeria.

During the first of the two visits, Dr. Akpom and Dr. Markakis, as members of the M.S.U. co-investigating team, and Dr. Barnes/McConnell representing the Management Office met with our counterparts at Ibadan and Jos. Detailed joint review of the second draft of the proposal was undertaken, and the plan of work as outlined in the draft proposal was modified to take into account the specific concerns of the host country researchers. In addition, procedures were outlined and responsibilities assigned to participants regarding the development of a "national" survey instrument and the conduct of the survey. The survey, as agreed, will utilize a single instrument, which will be developed and pretested by the participants from all the sites involved and will be conducted at communities respectively located close to each of the participating institutions at Jos, Ibadan and Nsukka. Resource requirements for each participating institution were outlined for the project and inter-institutional collaboration outlined. Based on this understanding and taking into consideration the constraints imposed by funding limitation, a third and final draft of the proposal was developed and submitted to the Board of Management for their approval.

During this visit, also, administrative procedures required for the conduct of these projects were discussed. These included the need to clarify arrangements for transfer of funds, procedure for regular accounting and determination of an appropriate official at each institution who will be responsible for

financial accounting. In addition, the need to obtain signatures on letters of Institutional Subagreement and Memorandum of Understanding (signed by appropriate institutional and country officials) was discussed. These documents were left with host country principal investigators for processing and return to the Management Office via the American Embassy.

By late July it was becoming very clear that the failure to obtain the necessary signatures from Nigeria would unduly delay the release of funds for the first year of the project. Letters and telex messages sent to Nigeria elicited no responses. In addition, preproject activities revealed some implementation problems that needed immediate attention in order to salvage the proposed inter-institutional and interdisciplinary survey. By mid-August the Management Office thought it necessary to send Dr. Akpom to Nigeria to (a) attempt to obtain the necessary signatures and (b) try to resolve the problems related to the planned survey. Both goals were accomplished during the trip. In addition, a plan of work was developed for a multidisciplinary approach to the instrument development (see attachment 1).

Also, tentative plan was made for the visit of Dr. David Drew to the U.S. As planned in the proposal (page 29) Dr. Drew is to visit the U.S.A. for a period of about four weeks to study the use of Gas Hydrogen Analysis technique in metabolic study of weanling infants. Following his visit Dr. Drew is expected to return to Nigeria with one of the equipments and at the end of the second year is expected to have trained two Nigerians in the use of the technique.

In preparation for the visit, Dr. Wanda Chenoweth has made tentative plans for Dr. Drew to spend some time at M.S.U. and then make a brief stop at the laboratories of Dr. Noel Solomon at M.I.T., Cambridge, Massachusetts; Dr. Donald Barr of the Department of Pediatrics at Montreal Children's Hospital, Montreal, Canada; and one or two more sites where the technique is currently in use. Trips to the factory where the instrument is manufactured are planned for some

of the PI's and Dr. Drew with a view to exploring the incorporation of modifications that would make the instrument appropriate for use in Nigeria. For example, the power supply should be modified for use with 240 volts supply and/or battery use. If necessary, moving parts or those that tend to wear out would benefit from modular design which will allow for their unplugging and replacement with spares while the damaged parts are returned to the U.S.A. for repairs.

Also, Equipment Authorization and Request for Purchase forms are being readied for the purchase of items requested in the budget which are necessary for the initiation of the project.

Current Problems

The only major problem is the tardiness of communication between U.S. and Nigeria. Even when one assumes that our host country colleagues will respond to our letters on the same day as they receive them (rather unlikely event) the minimum turnabout time will be between four to six weeks and often longer. In some instances correspondence may get lost in the mail.

During his latest visit to Nigeria, Dr. Akpom has discussed the problem with several host country participants. From this it was learnt that telex or telephone messages from participating American Universities can be sent to the National University Commission (NUC) in Lagos for transmission by radio to the respective universities. Thus, there seems to be an alternative. However, the implication is that a more expensive alternative may have to be used. But one has to bear in mind that in comparison to the inevitable delays or loss of mail, the NUC route may be more cost-effective. This advantage notwithstanding, certain mail (documents and supplies) cannot be sent by this route.

(B2) Unusual Developments

None so far.

(B3) Favorable Aspects

The amount of cooperation which was extended to the PI while he was in Nigeria for this project was rather high and reassuring. Clear evidence of enthusiasm for the project was manifested by almost all host country participants

(C) Summary of Travels (October 1, 1980-September 30, 1981)

Two oversea travels were undertaken for the project during the year. Both were discussed in Section A above.

Dates:

1. April 3-April 12, 1981 - USA to Ibadan and Jos (return)

   Travelers: Dr. P. Markakis and Dr. A. Akpom

   Purpose: To complete arrangements and finalize plans for research with host country participants.

2. August 22-September 6, 1981 - USA to Nsukka to Jos to Ibadan to Lagos (return)

   Traveler: C. Amechi Akpom, M.D.

   Purpose: To obtain relevant signatures on Institutional Subagreements from collaborating Institutions and Memorandum of Understanding from the Federal Ministry of Economic Planning in Nigeria. Also to refine the plan of work for the development of joint survey instruments.

(D) Summary of Roles and Responsibilities of Women

Dr. Wanda Chenoweth (MSU) has taken leadership for arranging sites for the study of use of Breath Hydrogen Analysis technique for our host country participant. She is our expert in this field and we rely heavily on her in this area. Participation of host country women remains as planned in the proposal. Until we are able to transfer funds to our counterparts in Nigeria,

they will not be in a position to initiate participation.

(E) Status of Participant Training

As mentioned in Section A of this report, arrangements are underway for Dr. Drew's visit to the USA to be trained in the Breath Hydrogen Analysis Technique (see page 29 of the proposal).

Recruitment of graduate student for training in the USA is in progress (page 29 of the proposal).

(F) Information/Suggestions/Insight to be Shared

Suggestions which were gained from trips to Nigeria were appended to the Extended Trip Report submitted to the Management Office at MSU. They are reproduced and attached here as Attachment 2.

(G) Details of FY-82 Different from the Proposal

The most important program adjustment anticipated is the shift in schedule which recognized the fact that funds for the project were released in September instead of 1st of July as initially expected. Hence, while certain activities outlined for the first year have been initiated, the entire schedule of work outlined in the proposal (page 12a) has been moved forward for three to four months. Similarly, budgetary adjustments will be undertaken by moving the expenditure of the fourth quarter of FY-82 to the first quarter of FY-83. This is expected to amount to 25% of Salaries and Wages or a total sum of $5,125 (i.e., 25% of AID salaries and wages contribution of $33,405 less the Graduate Students' salary of $12,500). Other items on FY-82 such as equipment, supplies and travel cost would have been expended or committed by the final quarter of FY-82.

Bean/Cowpea CRSP Report - Funding Year 1981

(to October 1981)

Principal Investigator: Kay H. McWatters

Project Code: Nigeria/UGA/McWatters

Date Subgrant Received: September 1, 1981

A. Summary of Overall Progress

The Bean/Cowpea CRSP Management Office (MO) received signed Memorandum of Understanding (MOU) and Subagreement documents for the Nigeria/UGA/McWatters project on September 8, 1981. The MO notified Kay McWatters, P.I., on the same date that administrative requirements for establishing the project had been completed and that the initiation date for the project would be September 1, 1981. Funds are in the process of being transferred from the MO to the University of Georgia and subsequently to the University of Nigeria, Nsukka.

The major emphasis during the first year will be the development of a survey instrument to determine socio-cultural and dietary factors associated with cowpea consumption in the Anambra State of Nigeria. The instrument will be pretested and refined as needed prior to its use in the survey. Other activities planned for the first year include a survey of cowpea processing technologies with special emphasis on dehulling and milling techniques, acquisition of cowpea seed from Nigeria for studies to be conducted in the U.S., initiation of storage studies of whole seeds to be held for subsequent processing, and a preliminary study of the microbiological quality of cowpea meal.

B. 1. Current Problems

Lack of telephone/telex service and slow mail service in Nigeria have complicated and delayed communication between U.S. and Nigerian collaborators.

3. Favorable Aspects

We have recently learned that Dr. P. O. Ngoddy, Host Country P.I., has secured ₦40,000 ($72,000) from local sources in Nigeria to supplement the CRSP project.

C. Summary of Travel Through September 30, 1981 (including pre-Subgrant travel)

Dr. Larry R. Beuchat, Co-Investigator, University of Georgia, travelled to Nsukka, Nigeria during the week of March 1-7, 1980 to discuss proposed research with collaborators at the University of Nigeria. He was accompanied by Dr. Pat Barnes-McConnell, Bean/Cowpea CRSP Management Office, and Dr. C. Amechi Akpom, P.I., Michigan State University, who will be conducting research in Jos and Ibadan, Nigeria. The purpose of the trip was collaborative planning and preparation of a project proposal in the area of cowpea processing and utilization to be supported by the Bean/Cowpea CRSP. The preliminary draft formed the basis of a detailed proposal prepared by the U.S. team; it was reviewed by H. C. collaborators and the Technical Committee and revised in accordance with their suggestions.

Kay McWatters, P.I., and Larry Beuchat, Co-Investigator, University of Georgia, and D. R. Isleib, Bean/Cowpea CRSP Management Office, travelled to Nsukka, Nigeria, May 9-15, 1981 for final review and modification of the project proposal with P. O. Ngoddy, Host Country P.I., and Co-Investigators in the Departments of Food and Home Sciences and Sociology/Anthropology at the University of Nigeria. Roles of participants and budget allocations were discussed, and a second-year budget was developed. Dr. Isleib also initiated

steps to execute the MOU and Subagreement with the University of Nigeria, Nigerian University Commission, and the U.S. Embassy. Details of budgets and proposal revisions were incorporated by Kay McWatters upon return to the U.S., and the revised proposal was accepted by the Board of Directors on May 28, 1981.

Dr. Amechi Akpom returned to Nigeria in August, 1981 as a representative of the Bean/Cowpea CRSP Management Office to determine the status and location of the CRSP documents (MOU's and Subagreements) for projects in Nsukka, Jos, and Ibadan and to attempt to obtain the signatures required to complete the documents. He also held discussions with Dr. P. O. Ngoddy, Host Country P.I. in the Department of Food and Home Sciences, and Dr. Azuka Dike, Co-Investigator in the Department of Sociology/Anthropology, concerning management of the project and coordination of efforts between the two departments and between the two CRSP projects in Nigeria. Dr. Akpom was successful in his efforts and delivered the completed documents to the Bean/Cowpea CRSP Management Office on September 8, 1981.

D. Roles and Responsibilities of Women Technically Involved in the Project

Kay McWatters is the U.S. Principal Investigator. In addition to project coordination, she is responsible for the functional and organoleptic evaluations for the U.S. team.

Veronica Onuorah is a H.C. Co-Investigator and is responsible for organoleptic evaluations for the H.C. team.

Francisca Uzo, a June, 1981 graduate of the University of Nigeria, Department of Food and Home Sciences, conducted research for her thesis on technologies to condition cowpeas for mechanical dehulling (seed coat removal). Though her work was not supported by CRSP funds, the findings will be extremely beneficial to U.S. and H.C. researchers for certain aspects of the proposed research.

BEAN/COWPEA CRSP REPORT - FUNDING YEAR 1981

(to October 1981)

Principal Investigator: Professor A. E. Hall

Project Code: Senegal-ISRA/University of California, Riverside/A. E. Hall

Date Subgrant received: August 1, 1981 (initial advance of funds received October 12, 1981)

Date Subordinate Agreements (copies are attached):

with K. W. Foster, University of California, Davis, August 1, 1981 (funds sent to Davis on October 15, 1981)

with V. Marcarian, University of Arizona, Tucson, August 1, 1981 (funds supplied on a reimbursement basis)

with ISRA, Senegal, August 1, 1981 (some equipment forwarded on November 11, 1981; and an initial advance of funds sent on November 17, 1981).

A. Summary. The subgrant began on August 1, 1981 providing an operational period of two months. However, substantial accomplishments were made during the summer due to the extensive preplanning, and the faith and commitment of the participants in this project. Accomplishments are discussed in relation to the first year objectives listed on the summary page of the proposal.

1. Develop and apply screening techniques to identify genotypes with improved drought adaptation, heat resistance and yield potential in California and Arizona.

Drought adaptation. Thirty advanced cowpea lines, most of which are being tested in Senegal, were evaluated for drought resistance and yield potential in cooperative tests at the University of California, Riverside (UCR) by A. E. Hall, and at the University of California, Davis (UCD) by K. W. Foster. Plants were subjected to controlled levels of drought by growing them on stored soil moisture, and to optimal irrigation. A trainee from ISRA, Ndiaga Cisse, evaluated genotypic and drought effects on seed yield, dry matter production, and harvest index in the trial at UCD. V. Marcarian evaluated a sprinkler irrigation gradient system for determining drought resistance in cowpeas using strains from the US and Senegal at the University of Arizona (UOA).

B. Robertson, who is a Ph.D. student at UCR, evaluated a field screening technique for selecting genotypes with improved rooting, and improved ability to extract water from soil under drought. In addition,

she is studying the inheritance of earliness in day neutral cowpeas to facilitate the development of varieties with an extremely short life cycle for use in the more arid zones of Senegal. V. Marcarian has discovered several early cowpea strains in an extensive nursery which she grew in Arizona.

Heat Resistance. The responses of cowpeas to heat stress have been characterized by Mohamed Warrag, who is a Ph.D. student in Botany at UCR from the Sudan. He has developed a field method for screening cowpeas for tolerance to heat. Using this method he has discovered 3 cowpea strains which appear to have superior heat tolerance to either the Bambey series of cowpeas from Senegal or the Blackeye types from California. V. Marcarian has begun screening a large number (500) of cowpea strains for heat tolerance in Arizona.

Yield Potential. A breeding project has been initiated at UCD by K. W. Foster and J. Ehlers, who is a Ph.D. student in Genetics at UCD. In this project, yield potential will be improved by incorporating improved canopy architecture and plant type using cowpea strains from Senegal and IITA.

2. Determine the suitability of different types of cowpea cultivars and management systems for sole-cropping and intercropping in Senegal.

Scientists at ISRA have conducted research in this area, and the results are being analyzed at this time. ISRA intends to send three representatives to a planning meeting at UCR in January, 1982, and these results and all phases of the CRSP will be discussed at this time. The US scientists were not able to cooperate on the research on this objective in Senegal due to the late start of the CRSP.

3. Evaluate the adaptation of cultivars and advanced lines of cowpeas as sole-crops in cooperative field testing in Senegal, California, and Arizona.

Advanced lines (27), supplied by A. E. Hall at the request of ISRA, have been evaluated at the National Center for Agronomic Research (CNRA), Bambey, Senegal for yielding ability and useful agronomic characters. These material are progeny from a cross between California Blackeye No. 5 and Bambey 23, the latter is a variety developed by D. Sene who was the cowpea breeder at Bambey prior to his undertaking administrative duties as Minister for Research. These same lines were tested at UCR and UCD, and it is apparent that strong genotype x environment interactions are present. Some of the lines gave high yields in Senegal and should be useful to the cowpea breeding program of ISRA.

4. Determine the extent of problems due to insect pests of cowpeas with different cropping systems and with diverse cultivars in Senegal.

Scientists at ISRA have conducted research in this area and the results will be discussed in the planning meeting as described for objective 2.

Research programs have been initiated at UCD by K. W. Foster which may help the scientists at ISRA to overcome the problems of insect pests

and diseases. He has identified cowpea strains with resistance to lygus bugs, which are a major pest in California. Recent information indicates that some of the resistance to flower- and pod-sucking insects may be generally effective against several insects. Consequently, these sources of resistance may be useful to the cowpea breeding program of ISRA. D. Severtson-St. Clair, who is an MS student with K. W. Foster at UCD, is working on the development of cowpeas with improved resistance to fusarium wilt, which is a major world-wide problem for cowpeas.

5. Initiate a training program for Senegalese students and the cooperating scientists.

Ndiaga Cisse was identified by ISRA as a candidate for training in this CRSP. He came to the US in January 1981 supported by another source of USAID funds because the subgrant had not been signed at that time. He studied English for one quarter and then in the spring quarter, 1981, he enrolled in the MS program in the Department of Agronomy and Range Science at UCD under the direction of Dr. K. W. Foster. During the summer he conducted research on the cooperative cowpea trial of the CRSP at UCD.

6. Establish linkages with international and national organizations involved in cowpea improvement, and the other cowpea/bean CRSP projects.

The US research team (Hall, Marcarian and Foster) participated in a week of project development and planning with the host country research team (Mbodj, Diatta and other ISRA scientists) at CNRA, Bambey in Senegal during April, 1981. V. Marcarian and K. W. Foster visited Nigeria during the following week and established linkages with IITA at Ibadan. During the summer of 1981, V. Marcarian planted a cowpea nursery of material from IITA in Arizona. V. Marcarian and K. W. Foster have obtained additional cowpea strains from IITA for evaluation in 1982. Copies of the proposal and requests for further cooperation in field testing, and the exchange of germ plasm and information have been sent to IITA and ICRISAT. During 1981, K. W. Foster visited E. Watt who conducts a major cowpea breeding program for IITA and the government of Brazil. R. Fery from the USDA laboratory in Charleston visited UCD and provided useful information on the development of cowpeas with resistance to insects, nematodes and diseases. The project leader from Senegal (M. Mbodj) visited UCR, UCD, UOA, Texas A&M and the CRSP management office at MSU during September 1981: to conduct project planning with the US research team; and to evaluate cowpea, sorghum and millet research in the US. During this same period the Director General of Agricultural Production in Senegal (B. D. Coly) visited UOA and UCR. B. D. Coly is the director of one branch of agricultural extension in Senegal, and his visit provided an opportunity for discussing methods for improving communication between farmers, extension and the CRSP.

B. (1) Current problems. In some circumstances, communication has been difficult due to the need for sending information through the Management Office and USAID. The lines of communication should be simplified so that the project leaders in the US and Senegal can communicate directly on most issues.

(2) Unusual developments. The proposed merger of Senegal and Gambia was not anticipated. But it should not influence the project since cowpeas are mainly grown in the Diourbel region, and few cowpeas are grown in Gambia.

(3) Favorable aspects. The support and commitment of the Senegalese and US cooperators to this project has been quite remarkable. It is important that this momentum should be maintained.

C. Summary of Travel

Project development

March 28, 1981 P. Barnes-McConnell, K. W. Foster, A. E. Hall and V. Marcarian went from the US to Senegal
March 29,30,31 in Dakar for meetings with ISRA and USAID
April 1,2 in CNRA, Bambey for meetings with research scientists of ISRA
April 3 A. E. Hall returned to the US
April 4 P. Barnes-McConnell, K. W. Foster and V. Marcarian went from Dakar to Lagos, Nigeria
K. W. Foster and V. Marcarian visited IITA at Ibadan for 4 days and then returned to the US.

Visit by project leader in Senegal, M. Mbodj, to the US Institutions (expenses paid by another USAID fund).

Sept. 7 Senegal to UCR
Sept. 8 to 16 at UCR with A. E. Hall
Sept. 16 Riverside to Davis
Sept. 16 to 23 at UCD with K. W. Foster and N. Cisse
Sept. 23 Davis to Tucson
Sept. 23 to 28 at UOA with V. Marcarian
Sept. 28 Tucson to College Station
Sept. 28 to Oct. 1 at Texas A&M with O. Smith
Oct. 1 College Station to East Lansing
Oct. 1 to Oct. 4 at MSU with Management Office
Oct. 4 return to Senegal

D. Roles and responsibilities of women

Dr. V. Marcarian is a US Co-investigator at UOA. B. Robertson is a Ph.D. student in Genetics at UCR. She is conducting research on the CRSP under the direction of Dr. A. E. Hall, and plans to become a plant breeder. D. Severtson-St. Clair is an MS student in Agronomy at UCD, and is conducting research on the CRSP under the direction of Dr. K. W. Foster. Further discussions of the role of women in cowpea production in Senegal will be conducted at the planning meeting in January, 1981.

E. Status of participant training

The training program for the Senegalese student at UCD was discussed in A5. In addition, the research of three Sudanese students (one MS student at UOA and two PhD students at UCR) is being supported by the CRSP. These students have scholarships from the Sudanese government but the CRSP support enables them to conduct research that is relevant to Africa.

F. Information for other projects

This project can provide assistance to other projects in evaluating the heat tolerance or drought adaptation of cowpea strains. Scientists

who can benefit from this assistance should provide A. E. Hall with information concerning the number of strains to be evaluated, photoperiod sensitivity, days to flowering, and growth habit.

G. Objectives for Funding Year ending October 1982

The objectives of the first year are extended and two more objectives have been added.

1. Develop and apply screening techniques to identify genotypes with improved heat resistance, drought adaptation, and yield potential in California and Arizona. Supply selected genotypes and screening methodology to the cowpea improvement program in Senegal.

2. Determine the suitability of different types of cowpea cultivars and management systems for sole-cropping and intercropping in Senegal.

3. Evaluate the adaptation of available cultivars and advanced lines of cowpeas at Bambey and Louga in Senegal, and at UCR and UCD in California.

4. Determine the extent of problems due to insect pests of cowpeas with different cropping systems and with diverse cultivars in Senegal.

5. Initiate training programs for additional Senegalese students at UCR, UCD or UOA.

6. Continue communication with international, and national organization involved in cowpea improvement, and the other cowpea/bean CRSP projects.

7. Determine the influence of rhizobia (at UOA) and of mycorrhizae (at UCR) on the performance of cowpeas under drought in soils that are deficient in nutrients.

8. Initiate a program to develop varieties with resistance to pests and diseases at UCD which supplements the cowpea breeding program in Senegal.

Budget for the Funding Year ending October 1982

The carry forward from the funding year ending October 1981 will enable this CRSP to continue operations into early 1982. However, the major expenses occur between May and the end of September. This project can make effective use of the original estimated budget for the second year which is $154,480.

Title XII B/C CRSP Annual Report to 30 Sept 1981

Principal Investigator: Dr. M. J. Silbernagel
USDA, ARS Research Plant Pathologist

Co-Investigator: Dr. Jean Due (Socio-economic aspects)
University of Illinois

Project Code: Tanzania/WSU/Silbernagel

Project Title: Breeding beans (Phaseolus vulgaris) for disease and insect resistance and determination of their economic impact on subsistence farm families

Date MSU-WSU Subgrant Received: 1 June 1981

Date Subordinate Agreements made with collaborating institutions:

WSU - U of Illinois: Subordinate agreement signed 8/5/81 by U of Ill. and returned to WSU. Copy enclosed (attachment A).

WSU-U of Dar es Salaam: Subordinate agreement prepared and signed by WSU in the mails. Copy will be sent as soon as I receive one.

A. Summary of overall progress.

The Memorandum of Understanding between MSU and the U of DSM, and the subagreement to implement a project proposal between WSU and U of DSM were both signed and implemented April-May 1981. The subgrant between MSU-WSU was implemented 1 June 1981, and the first quarter funds have been forwarded to WSU. The subordinate agreement between WSU-U of Ill. has been signed but funds have not yet been transferred (they should be soon). The subordinate agreement between WSU-U of DSM has been sent to Tanzania for their approval and signatures. Since mail service to and from Tanzania is very slow, it may be several more months before that subordinate agreement is executed and the funds transferred to Morogoro. In general, full implementation (with funding in place) will be 6-12 months later than originally expected. This has put quite a strain on initiation of project related work, and placement of graduate students at all locations, and socio-economic data gathering in Tanzania.

Some socio-econ data gathering costs (estm $5000) in Tanzania were expended by the U of DSM in expectation of the initiation of Title XII BC/CRSP funding over a year ago. Although they gathered some good preliminary data (attachment B), further data collection is awaiting the transfer of funds from WSU to Morogoro.

About 20 lbs of bean seed, representing various sources of disease resistance, were carried to Morogoro by Silbernagel in April. These lines and a large local collection were increased at Morogoro to provide enough seed volume to initiate first year objective #1, i.e. to collect and evaluate beans for pest resistance and agronomic characteristics.

At Prosser, a number of African bean lines were screened for reactions to Bean Common Mosaic Virus strains (attachment C) to identify which sources of resistance are best suited for initial hybridization. It appears Leakey's lines with dual resistance to BCMV and Anthracnose should be crossed to African

adapted lines and sources of rust, halo blight, common blight, and angular leaf spot resistance, obtained from Uyole, Ilonga, New York, Puerto Rico, and CIAT.

A Taiwanese graduate student (Simon Wang) at WSU Dept. of Plant Pathology, is doing his Ph.D. thesis research at Prosser under Drs. G. I. Mink and M. J. Silbernagel. He is being supported by the BC/CRSP through Silbernagel's project. He will develop antisera to the seven known pathotypes of Bean Common Mosaic Virus and then study the degree of serologic strain specificity.

No progress was made in pursuit of first year objective #2, "to initiate economic assessment of direct losses by selected diseases and insects", because funding has not yet arrived in Morogoro.

The preliminary results (attachment B) were obtained by Drs. Due and Anandi on first year objective #3, "Survey present smallholder farming systems to determine labor and other inputs, timing of production and harvest operation Estimate the volume of beans produced, stored and consumed and marketed."

First year objective #4, "Begin training of Tanzanian student." Jeremiah Rugambisa is undertaking a program of graduate studies towards a Ph.D. in Agric. Econ. at the University of Illinois under Dr. Jean Due.

It is not known if any progress was made on first year objective #5, "Begin collection of major pathogenic organisms." This is because funding in Tanzania has not yet been accomplished and mail communication is very slow.

B. Indicate and explain.

Current problems: The main problem is getting the subordinate agreements signed and the funding transferred so that research can begin. We are about 1 year behind schedule. This has undoubtedly put some strain on the U of DSM, Morogoro budget since they expended about $5000 of their own funds to get the socio-econ data gathering underway last season. Unfortunately, a year later the Title XII money is still not in Morogoro.

Communications is the next most limiting factor. Mail service to and from Tanzania is very slow.

We have had some problems relating to the level and standards of Tanzanian graduate student support because of a misunderstanding at WSU regarding the sponsorship (or lack of) by US-AID. I think that has been resolved.

C. Summary of travel.

J. Due: Nov 10-30, 1980 to Dar es Salaam for conference with US-AID-Dar re research clearance, etc., and to Morogoro campus to confer with colleagues re questionnaire, data collection, sample sites, sample selection, etc.

J. Due: Apr 10-22, 1981 to Dar es Salaam, Arusha, and Morogoro re project development.

M. Silbernagel: Apr 12-May 1, 1981 attend Farming Systems Research Conference at Arusha. Dar es Salaam to complete memorandum of understanding and subagreement to implement a project proposal. Morogoro to finalize research plans for bean improvement project.

J. Rugambisa: Aug 28-30, 1981 from Morogoro to Champaign-Urbana, IL, to undertake graduate studies at the U of Ill.

P. Anandi: June 28-July 28, 1981 Morogoro to Urbana while on home leave to consult with Due re computer facilities at U of Ill and to set up the program for the farming system data analysis. See Due's report (attachment B, p. 4).

D. Summary of WID concerns - see Due's report (attachment B, p. 4-D).

E. Status of Participant Training

See Due's report (attachment B, p. 1-AIII). Mr. J. Rugambisa from Tanzania is enrolled in Ph.D. program in Agric. Econ. at U of Ill under Dr. Jean Due.

F. Information/suggestions/insights, etc. to share with colleagues in other projects. See Due's report (attachment B, P. 4-F). Amen.

G. Details of FY 82 different from the project proposal, i.e. program or budget adjustments.

In essence, the delays in placement of funding have set the program back one year. In FY 82 we will be working to achieve the objectives outlined originally as FY 81 objectives.

H. Project Roster (attachment D).

ATTACHMENT B

Bean/Cowpea CRSP Report -- Funding Year 1981

Principal Investigator: Dr. Matt Silbernagel

Tanzania-Washington State Un

Date Subgrant received: June 1, 1981

Date Subordinate Agreements: July 23, 1981

A. Proposed goals were as follows: (re-socio economic aspects)

I. Economic assessment of direct losses caused by selected diseases and insects. No progress was made on this goal as no data were forwarded from Tanzanian counterparts to Illinois for analysis; data in Tanzania could not be gathered due to non-flow of funds from WSU to Tanzania.

II. Study subsistence farm families to determine present intercropping system inputs, timing of production, consumption and marketing. Results are given in a) to g).

III. Train 1 Tanzanian student in Agricultural Economics at the University of Illinois; Jeremiah Rugambisa, a Tanzanian faculty member at the University of Dar es Salaam, Morogoro is enrolled in the Ph.D. program in Agricultural Economics at the University of Illinois. Rugambisa has arrived, is attending classes and has appeared to have settled in well.

Re II. A sample of 60 small-farm families in three different villages in major bean growing areas of Morogoro Region of Tanzania were interviewed to obtain the data outlined above. Some tentative and interesting results have been obtained:

a) The major food crops grown by these farm families were maize, sorghum, rice and beans. Minor crops were cowpeas, cassava, sesame, bananas, yams, pigeon peas, lablab, green gram, onions and other vegetables. Crops grown principally for sale were cotton and sunflowers. The percentage of the farms and acreage of principal crops grown is shown in Table 1 below.

Table 1. Proportion of Farmers and Average Areas Under Major Crops, Kilosa, Tanzania, 1980

	Percentage growing	Average size (hectares)
Maize	100	1.1
Beans	45	.4
Sorghum	63	.3
Rice	63	.3
Cotton	60	.3
Sunflower	72	.2
Average all crops		3.1

b) About 90 percent of the families which grew beans grew the large reddish brown type of Canadian Wonder, locally called Kenia. The other varieties were the small red and small black. In this area (Kilosa) beans are usually planted after maize or paddy has been harvested or they may be planted in maturing maize; planting is done in mid-April to June. The crop season is shown in the attached time graph.

In preparing the land for planting, weeds and grasses are cut by pangas or scraped off by hoes. Planting the seeds is usually done by digging (not too deeply) with a small hoe or by using a specially made stick to make the holes. Seeds were covered by hands or feet. Beans may be planted with small patches of onions, tomatoes or cowpeas but most often they were planted alone.

Although all the farmers surveyed did not grow beans, all of the households consumed dry beans. Survey data could not identify the numbers of times per week beans were consumed; a small sample of families indicated beans were consumed at least once every 2 weeks. However, this sample was not adequate to indicate consumption habits throughout the year.

c) When asked the major problems associated with growing beans, 18 of the 60 farmers (30 percent) mentioned drought caused by failure of early rains to be followed with adequate moisture, 22 percent mentioned insects and 12 percent plant diseases; we do not know from the questionnaire the kinds of insects or diseases which proved troublesome. No doubt crop scientists at the University have this information.

d) Although 70 percent of the families grew sufficient maize that some could be sold, few of the families sold beans. In this area, beans were grown primarily for family consumption. At a later date relative returns per hectare from beans compared with other crops will be available as will relative labor requirements.

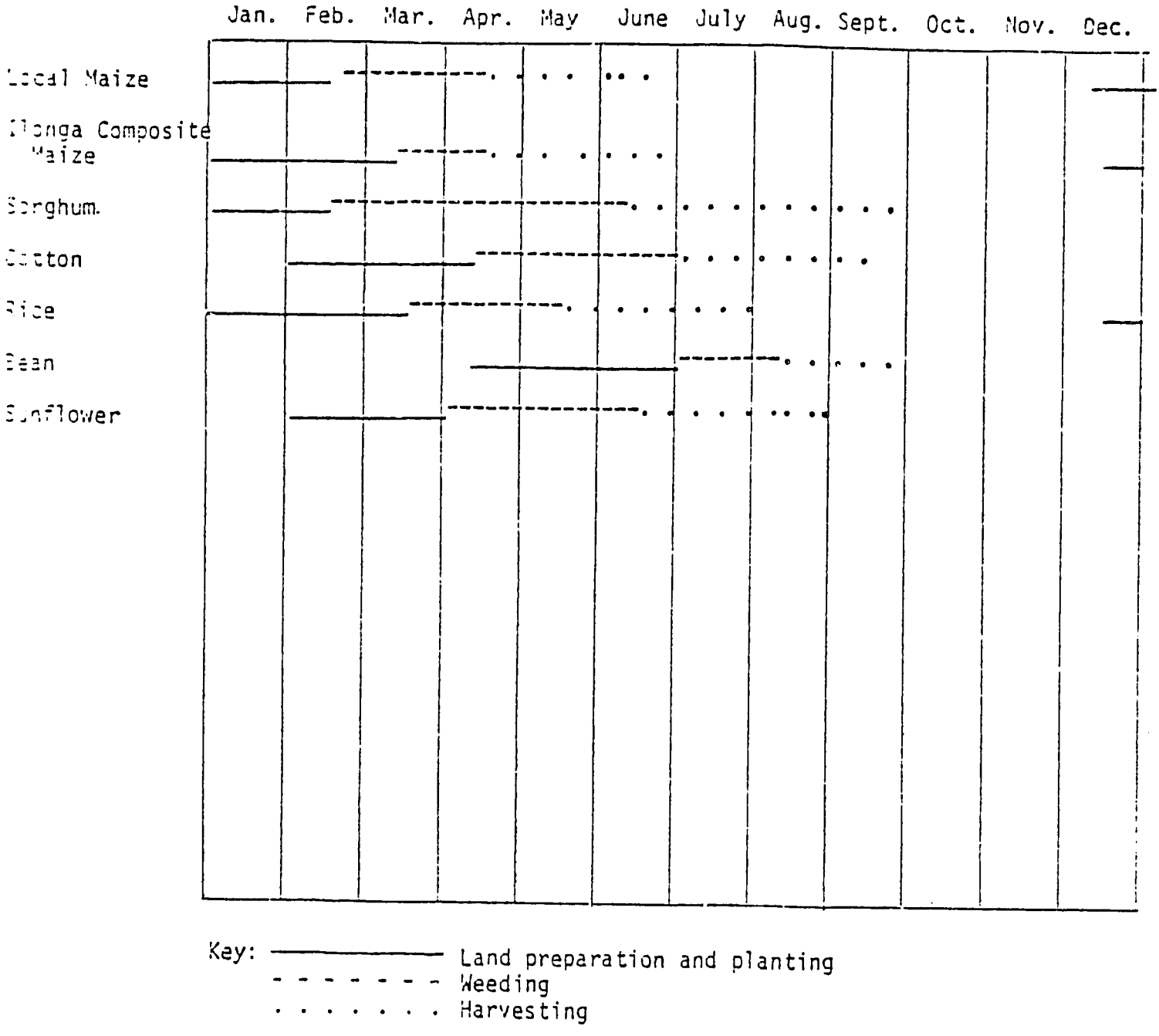
Seventy-six percent of the farmers had the multiple objective of providing food for the family and some money income; 16 percent mentioned food as the primary objective and 8 mentioned money as the primary objective. In 88 percent of the families, the husband and wife together made the decision as to which crops would be planted, in 7 percent the husband made the decisions alone and in 5 percent the wife alone.

e) Data are available on the capital investments per farm, total revenue generated, operating expenses incurred (although few used any purchased inputs), and official government prices and open market prices received.

f) Data on labor inputs by crop and sex have yet to be sent from Tanzania.

g) Much more analysis of the data remains to be done. Dr. Anandi modeled a typical farm on the computer; using linear programming he showed the effects of changes in inputs, net returns using government vs. open market prices, and so forth. This

Figure 1. The Crop Calendar for Major Crops, Kilosa District, Tanzania, 1980 Crop Year



program will be used to a greater extent when all data have been received from Tanzania.

B. The major current problem is that of getting funds flowing to Tanzania from WSU so that data collection can continue. As expected the supervision of data collection was highly important; this supervision was not carried out as adequately as necessary due to shortage of funds and transport. These deficiencies must be overcome in 1982. However, in spite of almost unsurmountable odds dependable data were gathered in Kilosa District from the 60 families mentioned above; less dependable data were gathered in Mgeta District; these data will have to be supplemented with data gathered weekly from each family in 1982. Data costs in 1981 were covered by the University of Dar es Salaam when CRSP funding did not arrive; undergraduate students were involved who needed similar data for their senior papers.

C. Travel: Due - November 10 to November 30, 1980 to Dar es Salaam (for conferences with USAID-Dar, research clearance, etc.) and to Morogoro campus to confer with colleagues re questionnaire, data collection, sample sites, sample selection, etc.

Due: April 10 to April 22, 1981 travel to Dar es Salaam, Arusha and Morogoro re subgrant project development.

Rugambisa: August, 1981 from Morogoro to Champaign-Urbana, Illinois to undertake graduate study.

Dr. P. Anandi from Morogoro to Champaign, Illinois to consult with Due on the computer facilities at the University of Illinois and to set up the program for the farming system data analysis. Since Dr. Anandi is the counterpart colleague at the University of Dar - Morogoro and is the person responsible for data collection in Tanzania, it was important for him to become familiar with the University of Illinois computer facilities and consult with University of Illinois faculty regarding the optimum program for the analysis. This was done from June 28 to July 28, 1981. Dr. Anandi brought copies of the completed questionnaires with him to the University of Illinois; these were checked jointly by Anandi and Due so that future data collection could be designed.

D. Jean M. Due, Department of Agricultural Economics, University of Illinois, is a co-investigator responsible for the socio-economic aspects of the Tanzanian CRSP together with colleagues at the University of Dar es Salaam, Morogoro. One of the host country undergraduate students involved in data collection was a female.

When collecting data on the farming systems in Tanzania, data were gathered relating to women's labor inputs, off-farm income, credit needs, and decision-making.

E. See III, page 1.

F. One could hardly anticipate the amount of red tape and other administrative details which slow up research in the CRSP. One wonders whether the intent is to train principal investigators in administration (and frustration) or assist in alleviating the world food problem through higher yielding, more drought and disease resistant beans/cowpeas!

ATTACHMENT C

African Lines Tested for BCMV Resistance*

Test	Accession	80 S#	Notes
1	Malawi 1	28	Canadian Wonder
2	Malawi 2	29	buff snap seed
3	Malawi 3	30	contender type seed
4	Malawi 4	31 (no seed)	late vine
5	Malawi 5	32	mottled plump red
6	Malawi 6	33 (no seed)	late vine
7	Kenya Mwezi Moja	52	Mukunya
8	Sutter Pink		BCMV sus control
9	NY 76-2886-2	91	HB res Wilkinson
10	Malawi contd seed	112	rust res bu
11	GLP-2 ROKO	92	PI 449428 van Rheenan
12	GLP-24 Can. Won.	93	PI 449429 van Rheenan
13	GLP-1004 Mwezi Moja	94	PI 449430 van Rheenan
14	ST-92 Mwibemania	95	PI 449431 van Rheenan
15	FS-44 Mwibemania	96	PI 449427 van Rheenan
16	PI 310522	110 (no seed)	Patel ALS res
17	Horsehead		Leakey ARE Anthr res
18	Xenia fields		Leakey ARE Anthr res
19	Oland		Leakey ARE Anthr res
20	2/7/2/2/2		Leakey ARE Anthr res
21	Royal Red Kidney		BCMV and CTV res DRK

*Dec 80 Prosser greenhouse 6 plts/virus strain

Prosser Dec 1980 Greenhouse 75-85°F Planted 6 seed/pot, read 2 wks post inoc-systemic reactions # plts with systemic symptoms/no. plants tested

Test #	NL-1	NL-2	NL-3	NL-4	NL-6	NL-7	NL-8	Uninoc ck
1	0?/5 mmm	5/5	5/5 NTK	5/5	5/5	6?/6 stunt	0/6	0/6
2	0?/5 mmm	5/5	1/5 NTK 4/5 MM	4/4	5/5	5/5	2?/6	0/6
3	2/5 mm	5/5	5/5	4/4	5/5	5/5	0/6	0/6
4	---	---	---	---	---	---	---	---
5	3/5 mmm	4/5	5/5	5/5	5/5	5/5	0/5 5 stunt	0/6
6	---	---	---	---	---	---	---	---
7	2/5 mmm	5/5	2/5 NTK 3/5 MM	5/5	2?/5	5/5	0/6	0/6
8	3/5 mmm	5/5	5/5	5/5	5/6	5/5	4/4	2?/6
9	1/5 mmm	2/5 mmm	1/3 NTK 2/3 MM	4/5	3?/3	3/6	0/5 4 ?	2?/6
10	3/5 mmm	5/5	4/4	6/6	5/5	5/5	2?/6	0/6
11	4/5 mmm	5/5	1/5 NTK 4/5 MM	5/5	3?/5	4?/5	0/5	0/6
12	3/4 stunt	4/4	3/5 NTK 2/5 MM	3/3 stunt	5/5 stunt	4/4 stunt	1?/5 I stunt	0/6 stunt
13	1?/5 mmm	3/3	3/4 NTK	4/5	3/4	5/5	0/0 1?	0/6
14	0?/5	5/5	5/5 PN	5/5	4/5	5/5	5/5	0/6
15	0?/5	5/5	3/3	5/5	1/4 SN	5/5	6?/6 mmm	0/6
16	---	---	---	---	---	---	---	---
17	0?/5 3 st	0/2	2/3 NTK	0/5 abn	0/4	4?/5 4 stunt	0/6 stunt	0/6 3 sm
18	0/4	0/3 abn	4/4 stunt	0/4 abn	0/4 abn	0/4 abn	0/3 2 abn	0/5 5 abn trif
19	0/4 abn	0/3	4/5 NTK	0/3 abn	0/3 abn	2?/4 abn	0/6 PN 4 abn	0/6 5 abn trif
20	0/5	0/5	5/5 NTK	0/5	0/5 abn	0/5 abn stunt	0/6 PN	0/5 5 abn trif
21	0/4	0/5	5/5 NTK	0/5	1?/5	0/4	0/6	0/6