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**DEVELOPMENT OF INSTITUTIONAL RESPONSE CAPABILITY
TO IMPROVE AND UTILIZE SOYBEANS FOR TROPICAL AND SUBTROPICAL AREAS:
A REDESIGN OF GRANT AID/CM/ta-g-73-49**

**A Proposal for Support
to the
Agency for International Development**

**by the
International Soybean Program (INTSOY)
College of Agriculture
University of Illinois at Urbana-Champaign**

September 1975

**Redesign of Grant AID/CM/ta-g-73-49
to Strengthen Capabilities in Improvement of Soybeans
for Tropical and Subtropical Areas**

**Applicant: The Board of Trustees of the University of Illinois,
Urbana, Illinois 61801**

Date: September 15, 1975

**Total
estimated cost: \$672,840**

Duration: Three years from October 1, 1975

**REDESIGN OF THE INSTITUTIONAL GRANT UNDER SECTION 211(d) OF THE
FOREIGN ASSISTANCE ACT OF 1966 TO THE UNIVERSITY OF ILLINOIS TO STRENGTHEN
CAPABILITIES IN IMPROVEMENT OF SOYBEANS FOR TROPICAL AND SUBTROPICAL AREAS**

Introduction

In September 1973, Grant AID/CM/ta-g-73-49 was awarded to the University of Illinois at Urbana-Champaign (UIUC) by the U.S. Agency for International Development to be effective October 1, 1973. The purpose of the grant was to strengthen the competence of UIUC, "...in a collaborative program with the University of Puerto Rico, to provide needed research, training, research and information linkages, technical assistance, and consultation on major problems related to improvement and development of production techniques for soybeans in tropical and subtropical areas. The developed competencies will be used to improve soybean production and utilization to provide protein in diets of low-income people throughout the world."

In April 1975, an AID team made an on-site visit to the University of Illinois at Urbana-Champaign to review the work accomplished during the first 18 months of the grant, and to explain changes in AID goals with respect to 211(d) grants. As a result of these discussions, UIUC agreed to redesign the 211(d) grant, taking into account experience and accomplishments of the first 18 months of the grant period, and to realign activities of the AID research contract to improve complementarity of grant and research contract activities. The following is the proposed redesign of the 211(d) grant program.

Description of the program. The development and rapid adoption of high-yielding sources of quality protein are priority items in efforts to alleviate world nutritional shortages. Soybeans, averaging about 40 percent protein with excellent nutritional balance and capable of producing high yields, are the most promising potential source of vegetable protein, and also produce large quantities of useful edible fats.

Presently, soybean culture is concentrated in the United States and Mainland China, with significant additional production in Brazil, Indonesia, Mexico, and

the Soviet Union. More than 90 percent of the world's soybeans are grown at latitudes greater than 30°. Recent evidence indicates that soybean cultivation also is practical in tropical and subtropical areas, including many regions where protein shortage presently is acute. However, more information is needed on the cultural requirements of the crop in these latitudes and varieties are needed which are better adapted to short day-lengths and high temperatures. There is an acute need for a mechanism to disseminate information and seedstocks which would contribute to high production, and for training of technical personnel in modern techniques of growing soybeans in lower latitudes.

The development of an institutional response capability extends beyond plant breeding and associated cultural practices, and the redesigned program includes the development of mechanisms to facilitate interdisciplinary advisory and consulting capabilities and the development and maintenance of information systems to serve soybean research workers in tropical and subtropical locations.

Capabilities of the University of Illinois. The University of Illinois at Urbana-Champaign has played a leading role in soybean research since the 1920s, and has enjoyed international reputation for the excellence of its soybean program since at least 1930. For the past 20 years, Illinois has been heavily involved in institution-building and agricultural advisory activities in several developing countries, and since 1965 has given a particular emphasis to international assistance in soybean development.

The University of Illinois, through its International Soybean Program, INTSOY, has had a significant role in assisting local research personnel to undertake successful soybean trials in a number of tropical and subtropical countries. As a long established center of excellence in soybean research, Illinois is in a unique position to further develop high competence in soybean improvement with special relation to the problems encountered in tropical and subtropical areas. The University of Illinois has outstanding staff, laboratories, research facilities,

library support and the basic infra-structure needed for a major international program in soybean research, development and linkages. In its College of Agriculture virtually all the departments are involved to some extent in research and teaching activities related to soybean.

The USDA/ARS Regional Soybean Laboratory, located on the UIUC campus, is the principal federal activity for research on soybean improvement. Activities of the project are closely coordinated with those of related university departments. All professional staff members of the project have joint university appointments and are available for consultation, cooperation, and supervision of graduate student research.

Outstanding library, laboratory and field facilities are utilized. Computerized information retrieval systems are a special feature of library operations. Recently experience with such facilities has been utilized by INTSOY in cooperation with the Illinois Natural History Survey to organize computerized information storage and retrieval systems for the university soybean insect collection, which is the largest in the world, and the USDA world soybean germplasm collection.

Specialized equipment available at Urbana-Champaign includes Varian Nuclear Magnetic Resonance equipment for rapid, nondestructive analysis for oil content, automatic amino acid analyzers, gas liquid chromatographs, and other apparatus required for the most sophisticated research.

Cooperative arrangements have been developed with the University of Puerto Rico/Mayaguez Campus which will enhance the direct capabilities of the University of Illinois for field work on soybeans in tropical environments. This grant is complementary to a 211(d) grant administered by the University of Puerto Rico/Mayaguez whose focus is protection of the soybean plant.

University of Illinois contributions. Funds provided by this grant will not replace existing funding of current projects. Activities carried out under this Grant will be additive and supplemental to existing and planned programs of the

University. In direct support of this Grant, the University of Illinois will provide:

1. Administrative costs including necessary time of Department Heads, other College of Agriculture administrative officers, and senior University officers.
2. Access to needed laboratories, equipment, field research, facilities and libraries.
3. Access to computer facilities under normal university policies.
4. Office and classroom space for faculty, students, and special meetings related to the program.
5. Consulting service of faculty members in fields related to topics covered by this Grant.

These facilities will be available to personnel working on the program.

Administrative organization. The Grant will be administered by usual procedures of the University of Illinois. It will be assigned to the College of Agriculture, Office of International Agricultural Programs. The project will be administered by a 211(d) Project Leader who will be responsible to the Dean of Agriculture. Staff members employed on Grant funds will report directly to their respective department heads for administrative and technical purposes and through them to the project leader for program coordination. Work under this Grant will be closely coordinated with operations of other soybean project at the University.

Salaries, stipends, travel allowances and funds for project operation will be allocated and the program administered by normal procedures of the University of Illinois in operating grant and contract funds.

A. Purpose of the Grant

The grant will be used by the University of Illinois at Urbana-Champaign (UIUC) to develop, mobilize, and maintain a U.S. institutional response capability in soybean production and use utilizing the competence, leadership and facilities of UIUC and the University of Puerto Rico, Mayaguez Campus, and focusing on the

solution of LDC problems with emphasis on technology applicable to the small farmer and improving nutrition of the urban and rural poor. Development of this capability will require the development of a core of experienced faculty with supporting knowledge generation, storage, retrieval, and delivery mechanisms providing the capacity to respond to the needs of the LDCs of the tropics and subtropics to improve their capabilities to produce food protein and calories and to market and use soybeans in direct economical forms acceptable and within the means of the urban and rural poor. As an outgrowth of the grant program, UIUC and associated U.S. institutions can be expected to build on the considerable temperate zone expertise in soybeans to become the center of competence in all phases of soybean production, protection, marketing, use, and information systems for the tropical and subtropical regions of the world.

B. Major Objectives/Outputs

The program will strengthen the competence of UIUC in selected areas and improve its communications with appropriate institutions in the U.S. and abroad so that an institutional response capability can be achieved in the areas of soybean production, protection, marketing, utilization and development of information systems for tropical and subtropical regions of the world. The primary thrusts in strengthening UIUC capability will be:

1. Improvement of educational capabilities at UIUC and associated U.S. universities and research and educational organizations for faculty and students to acquire greater knowledge, and thus greater institutional response capability, of production, protection, marketing, and use of soybeans in tropical and subtropical regions.
2. Development of soybean genetic technology for small farmers of the tropics and subtropics. Temperate zone genetic technology provides a base on which to build in developing high-yielding varieties, resistant to crop hazards, and neutral to farm sizes of the less-developed countries. With high yields, soybeans have the potential to out

produce nearly all crops in terms of both high-quality protein and calories per unit of land area. Focus on improved genetic technology to maximize protein and energy production per unit of input provides a meaningful multidisciplinary, interdisciplinary, problem-solving orientation to which virtually all applied agricultural disciplines can contribute. This approach also capitalizes on the complementarities of the UIUC and UPR-MC.

3. Development of soybean processing technology applicable to home and village scale operations for the rural and urban poor in tropical and subtropical regions. The need exists for highly nutritious soybean foods that require a short cooking time and can be processed in the home or at the village level. The nutritional content of these foods must be superior to foods they replace in the diets of the rural and urban poor. The focus on interactions between breeding and utilization activities characterize the interdisciplinary orientation of the grant program.
4. Development of mechanisms which facilitate effective interdisciplinary advisory and consulting capabilities relative to the production, and utilization of soybeans in the tropic and subtropic regions.
5. Serve in the leadership role in developing a network of organizations with congruent interests in pursuing the goal of capitalizing on the potentials of soybeans as a low-cost, high-protein and high-energy food for the rural and urban poor of the tropics and subtropics.

To summarize, UIUC will use the grant funds to develop the following capabilities and systems (outputs) all of which will contribute to the attainment of the program purpose. These outputs are: (1) an improved education and training capability; (2) an extended knowledge base and research capability; (3) an increased advisory and consulting capability; and (4) an expanded and strengthened set of linkages and networks.

The four outputs are discussed separately for convenience of presentation but it should be emphasized that interactions in activities leading to these outputs are designed to be complementary and that this interaction is crucial to attainment of the grant purpose.

Output I. Improved Education and Training Capabilities
in Soybean Production, Protection, and Utilization

Education and training capabilities will be strengthened, utilizing staff and facilities at both UIUC and the University of Puerto Rico, Mayaguez Campus. Other U.S. universities, research organizations, and international research centers in the soybean development network will be stimulated to join in an expanded role in education and training in the following areas:

1. Graduate studies. Graduate study of U.S., Puerto Rico, and tropical and subtropical country students will contribute to institutional response capability in three ways: (a) serve as resource personnel to faculty members in developing knowledge and expertise on soybean production and use under tropical and subtropical conditions; (b) contribute to the extended knowledge base through state of the arts and other studies; and (c) provide a means for developing interest and knowledge of soybeans in the tropics and subtropics thereby adding to the personnel pool for the international soybean development network.
2. The multidisciplinary and interdisciplinary core staff will interface with departmental committees and colleagues in graduate student selection, program development and evaluation. The core group will determine the appropriate mix of M.S. and Ph.D. programs within the program and among the various disciplines to maximize institutional response capability. Mechanisms will be developed for closer inter-institutional cooperation in admission and education of graduate students with interests in soybean production and use in the tropics and subtropics.

Expanded opportunities for graduate students to conduct thesis and dissertation research at international and national institutions in support of soybean program and multiple cropping and cropping system will be sought.

The core staff will recommend program and course modifications, or the introduction and development of new courses, required for a comprehensive program in soybean production, protection, and utilization. The number of students from LDCs of the tropics and subtropics in both the M.S. and Ph.D. programs who are interested in soybean production, protection, and utilization will be increased.

3. Seminars, workshops, conferences, special training. Small group gatherings, of both disciplinary and interdisciplinary type, will be implemented through the grant and coordinated with similar activities at UPR, Mayaguez. Emphasis will be placed on team effort, problem-solving approaches to improving the production, protection, and utilization of soybeans in the tropics and subtropics. Experience shows that there are individual soybean workers with considerable potential for professional growth, development and service to soybean production and use in the LDCs if provided the opportunity for special training experiences in association with established soybean scientists. A limited amount of grant funds will be used on a highly selective basis to facilitate such special training through supplements to such mechanisms as sabbatical leaves, faculty exchanges, and travel supplements.

Output II. Extended Knowledge Base and Research Capability

Research capabilities and the knowledge base will be expanded in the several areas of soybean production, protection, marketing, and utilization; however, special emphasis will be on improving the response capability of UIUC and associated institutions in providing improved soybean genetic technology and developing new

soybean processing technology applicable to home and village scale operations for small farmers of the tropics and subtropics. The experience of international research centers shows that this program focus holds promise of high returns from relatively small inputs.

Examples of areas that will receive emphasis in soybean breeding include (1) improved yield, (2) resistance to lodging, (3) resistance to seed shattering, (4) resistance to diseases and nematodes, (5) resistance to insects, and (6) improved seed and nutritional quality. This effort will be closely coordinated with the work of the UPR-MC under the 211(d) grant emphasizing the several aspects of soybean crop protection (entomology, pathology, nematology, and weed control) and the research work being conducted by the University of Illinois under Soybean Research Contract, AID-ta-c-73-19.

Examples of areas that will receive emphasis in food processing include (1) cooking quality of various soybean varieties, (2) nutritional studies of prototype soybean food products, and (3) development of new concepts for rapid preparation of whole bean soy foods and soy beverages. Initial studies suggest the possibility of differences among varieties with respect to cooking time for optimal tenderness. A careful examination and evaluation of varieties included in the soybean breeding and other exotic and vegetable strains of soybeans will be made. Varieties or strains of soybeans which are found to require significantly less cooking time will be reported to the plant breeding group to assist in developing varieties requiring less energy expenditures to process for human consumption.

Nutritional evaluations on various soybean products will continue. Work on previous prototype food products and observations of home and village processing methods in LDC's lead to the conclusion that extensive research in the U.S. on nutritional, and other, aspects of soybean foods is necessary before the concepts are released for adaptation to local taste preferences. Earlier, limited, studies showed that certain soybean products were superior to others in protein efficiency ration (PER). Various soybean cereal products exhibited substantial differences

in nutritional values. Additional work is required to determine the effect of processing variables on PER and to determine desirable soy-cereal combinations. Improved drying techniques will also be studied.

A need exists for highly nutritious foods that require only a short cooking time and can be processed at either the village level or in the home. While conventional methods of cooking whole soybeans require extensive soaking and cooking periods, a method that required only 30-40 minutes for rendering dry whole soybeans into nutritious foods would be highly desirable. Such a method would have many advantages, including savings in energy (fuel) and time of preparation; a source of employment and a new village industry, in the case of village level processing; and no loss of product which was soaked but not cooked, in the case of home processing.

A development study of concepts for rapid preparation of soy-based foods is nearing completion. Considerable work is yet required to adapt these concepts, and develop procedures, for home and village level processing of soybeans and cereals into highly acceptable products containing high protein and caloric values. Under the grant program, foods and processing procedures will be developed, with emphasis on generally accepted products which are suitable for all age groups. Special concern and interest will be placed on products which also serve as weaning foods. Effort will be directed toward development of both dry and wet products. Only work on adapting concepts and procedures will be developed in the U.S. Flavoring, garnishing and other organoleptic considerations will be developed by scientists within the LDCs.

A "state of the arts" study will be undertaken to identify the problems faced by small farmers of the tropics and subtropics as soybean foods make their way into the diets of the rural and urban poor. The study will generate an inventory of information on the availability and utilization of soybeans for human food in tropical and subtropical areas, concentrating on "noncommercially" processed soybeans. The study will identify the research, educational and developmental requirements for further expanding the production and use of soybeans.

Output III. Expanded Advisory and Consultation Capability

Current and future AID programs in soybean development require an expert response capability in production, protection, marketing and utilization for the LDCs of the tropics and subtropics. This grant will enable UIUC to develop and expand competence among its core staff to respond to AID, other donor, and LDC requests for expert advice or assistance in the problem area. Similarly, it will be used to improve the competence and availability of other soybean workers in the soybean network. The functions of advisors and consultants will include: problem identification and analysis, project design, and the several aspects of project operations including research, education, training, providing technical information and services, and participation in evaluation.

Maximizing response capability and availability will necessitate developing and maintaining an up-to-date system of inventorying and identifying soybean personnel expertise. Grant funds will be used to develop and maintain an up-to-date talent bank of institutional and individual capacity and expertise in soybean research, education, and development. The bank will include information on an international scale.

In order that personnel may work effectively in less-developed countries of Latin America, Africa, and Asia with critical needs for improved human nutrition and potential for soybean production and use, there is need for improvement of selected foreign language competence among UIUC and cooperating network institution personnel. For example, lack of Spanish capability is a constraint on institutional response capability in Latin America as is limited French use capacity for work in several African countries. Grant funds will be used to augment language training on both a group and individual basis. UIUC has an excellent foreign language instruction program, staff from which may be tapped to provide instruction to core staff. Language capability of other institutions in the international soybean

network will be used as a means of upgrading language competence; for example; the University of Puerto Rico, Mayaguez Campus relationship will serve as a resource for improvement in use of Spanish.

The core staff involved in attaining grant objectives will be drawn from many administrative units in a multidisciplinary problem-solving approach to expanded production of soybeans under small farm conditions and improved protein-calorie nutrition of the rural and urban poor of the less-developed countries. Individual specialties will include but not be limited to soybean genetics and breeding, fungal bacterial, and virus pathology, nematology, entomology, weed science, soybean cultural practices, agricultural engineering, agricultural economics, human nutrition, food chemistry, home and village scale processing, agricultural and home economics extension, and communications. As needs are identified, the many resources of the three campuses of the University of Illinois will be drawn upon. Expanding institutional response capability will require making release time of selected individuals available to improve knowledge of soybean production and use under the tropical and subtropical conditions of the LDCs. Grant funding will be used for release salaries and associated costs and other direct costs. Where it will add to faculty competence, technical and other assistants will be supported from grant funds. Faculty involved in the program will use grant funds only to support program elements in the grant outputs. The grant program directors will be partially supported by the grant and by other closely related soybean projects in order to gain the complementarities among the several elements of the overall programs of soybean development for the LDCs of the tropics and subtropics.

The core staff will be supported and augmented by cooperating specialists from other institutions working in soybean development. These cooperators will conduct and participate in seminars and conferences on the UIUC campus and at other

locations where appropriate, participate in preparation of papers that add to the knowledge base for UIUC staff and serve as a talent bank from which their expertise may be tapped for activities in LDCs.

Output IV. Expanded and Strengthened Linkages and Networks

UIUC, with the associated USDA Northern Regional Soybean Laboratory, in the leading U.S. soybean producing and processing state has well-developed U.S. research, educational, and private sector linkages. Soybean research, utilization, and grant support by the U.S. Agency for International Development has added to the UIUC soybean leadership role internationally. The August 1975 World Soybean Research Conference sponsored by UIUC, USDA and USAID attended by about 625 soybean workers from 48 countries, 33 U.S. states and Puerto Rico attests to the UIUC paramount leadership role.

A major purpose of this grant is to develop the UIUC, with the University of Puerto Rico, Mayaguez Campus, to serve in an intensified leadership role in mobilizing U.S. resources as the hub of an international network of organizations and individuals linked in ways to provide means for stimulating cooperative efforts, ensure effective utilization of program outputs, and contribute to sustaining future soybean development programs for the tropics and subtropics.

The following types of linkages will be elements of the soybean network.

1. Domestic linkages. A principal linkage for program development and administration will be developed between UIUC and AID. The program will work closely with the Office of Agriculture and the Office of Nutrition of the Bureau for Technical Assistance. Similar close working relations will be expanded and developed with the AID Regional Bureaus and with AID missions in cooperating countries for identification of soybean development opportunities and problems, establishment of relationships with country organizations and individuals and for evaluation of development projects and activities in the tropics and subtropical LDCs.

A second principal linkage for program development and outreach activities will be the University of Puerto Rico, Mayaguez Campus, providing the opportunity to add a major subtropical environment dimension, increasing response capability in the soybean protection areas, and with language and geographical advantages for serving the Caribbean area, Central and South America. UIUC and UPRMC will continue and strengthen their pattern of joint planning and implementation of research, staff exchange, and training.

A third principal linkage will be maintained with the Agricultural Research Service, U.S. Department of Agriculture primarily at the Urbana, Illinois and Stoneville, Mississippi Regional Soybean Laboratories, the Mayaguez Institute of Tropical Agriculture, and the Northern Regional Research Laboratory, Peoria, but also through personnel and facilities in Washington, D.C. and Beltsville, Maryland and the ARS scientists at Illinois, Puerto Rico, and other U.S. universities.

The already well-established relationship with soybean research and education personnel at U.S. universities will be strengthened and focused in a network oriented toward soybean production and use in the tropics and subtropics. Universities in the leading soybean producing states will have a special place in the U.S. part of the network: Iowa State University, University of Arkansas, University of Missouri, University of Minnesota, Purdue University, Ohio State University, and Mississippi State University. Several other universities have roles to play through special interests and competencies illustrated by the following: Tennessee (nematology); North Carolina (genetics, breeding, root-knot nematology), South Carolina (entomology); Kansas (food processing); California (pathogen-free seed production); and Florida (breeding). Special relationships will be developed with individual and consortia of universities with special problem international

interests that interface with soybeans, for example: Mississippi State University (seed technology); Oregon State University (weed science and control); University of Hawaii (nitrogen fixation by tropical legumes); North Carolina State University (root-knot nematology); Massachusetts Institute of Technology (international nutrition planning); University Consortium on Soils for the Tropics (Cornell University, University of Hawaii, North Carolina State University, Prairie View A & M College, and University of Puerto Rico) and the CUSUSWASH Council of U.S. Universities for Soil and Water Development in Arid and Sub-Humid Areas (University of Arizona, Colorado State University, Utah State University, and University of California). The Midwest Universities Consortium for International Activities, Inc. (MUCIA) of which the University of Illinois is a member includes, among its seven-member universities, five universities located in the nine leading U.S. soybean producing states. These MUCIA universities have well-established relationships and mechanisms for cooperation in implementing international development programs.

Domestic linkages will not be limited to government agencies and universities. Private foundations and private sector interests in soybean production, marketing, and use will also be included as a vital part of the soybean network where there is the interest and capacity to contribute to soybean development in tropical and subtropical areas.

2. International linkages. Primary international linkages will be established with the international research centers that include soybeans as a part of their research and outreach programs. Examples are the International Institute of Tropical Agriculture (IITA), with which a cooperative memorandum of understanding has been consummated, and the Asian Vegetable Research and Development Center (AVRDC). Linkages will also be established

with other centers that have an interest in soybeans through their multiple cropping and cropping systems programs, e.g., Centro Internacional de Agricultura Tropical (CIAT), Centro Internacional par el Mejoramiento de Maiz y Trigo (CIMMYT), International Centre for Crop Research in the Semi-arid Tropics (ICRISAT) and the International Rice Research Institute (IRRI). Grant funds will be used to develop and foster such linkages; however, additional funds will be sought from national and international agencies to carry out programs of joint and mutual interest.

Linkages already established with regional and international organizations will be improved and new ones developed where such institutions are interested in soybean development in the tropics and subtropics. Examples are the Food and Agriculture Organization of the United Nations (FAO), United Nations Development Program (UNDP), the International Bank for Reconstruction and Development (IBRD), and the regional development banks, the Southeast Asia Regional Center for Graduate Study and Research in Agriculture (SEARCA), and Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres (IRAT).

3. LDC linkages. Linkages with the institutions and professional personnel of the less-developed countries of the tropics, either directly or through regional and international organizations, are of prime importance. In the final analysis, national organizations must be effective for small farmers to increase production of food and for the rural and urban poor to have more protein and energy sources. INTSOY has established relationships with more than 85 countries through the INTSOY Soybean Variety Experiment (ISVEX) program, AID basic ordering agreement task orders, USDA-AID soybean production and processing training courses and soybean projects supported by national and international organizations. Grant funds will be used to broaden the multidisciplinary efforts and to

institutionalize relationships with individuals with emphasis on those countries where experience shows that soybean production and use have the greatest comparative advantage.

Many program activities will contribute to linking organizations individuals into an effective soybean network to serve the farmers of the tropics and subtropics and expand use of soybean foods among the poor. Each of the program outputs will complement specific activities undertaken to develop the network.

Visits by program personnel will focus on linked institutions in the LDCs to improve core staff awareness of environmental problems affecting the production and protection of soybeans and of technological and social problems encountered in their utilization as human food. Visits and exchanges by staff between linked institutions may be arranged to increase the capability of program staff in education, research and extension and other program activities.

Joint cooperative programs will be established upon request, subject to availability of funds. These programs will provide the opportunity to test the validity of transferability of practices or techniques and will also provide information which will contribute to preventing duplication of activities and will make it possible to direct and concentrate program resources on critical areas.

C. Program Scope, Activities, and Priorities

The scope of the program and activities to be carried out are outlined under the "Major Objectives/Outputs" section (page 3) and the work plans for the output program subcategories attached as an appendix to this redesign proposal.

In carrying out this program, emphasis will be placed on multidisciplinary and interdisciplinary teams from cooperating organizations in an integrated approach to the solution of LDC problems to help them increase their production of soybeans and the utilization of the product to improve the human diet.

The program priorities are reflected in the planned outputs and work plans. Since the inception of this grant, the first priority has been given to generating

hybrid populations leading to the development of soybean varieties adapted to tropical and subtropical conditions. Sustained priority in this area is warranted. Through the aegis of the global variety experiments, and a second-generation program of evaluation trials, parent lines of breeding stock are being selected. Of increasing priority interest is the protection of soybean plants from diseases and pests, work that is characterized by extremely close coordination and cooperation between UIUC and UPR-MC. The work will be increasingly closely coordinated with other collaborators in USDA, other U.S. universities, international centers and LDCs.

The utilization of soybeans as human food by the rural and urban poor in the tropics and subtropics is a co-equal priority area for this grant program. Building on work previously sponsored by UIUC, AID research contracts and other sources, new technology will be developed leading to reduction of preparation time of whole soybeans at the home or village level. Emphasis will be on generally accepted products which are suitable for all age groups but special concern and interest will be given to products which also serve as weaning foods. Nutritional quality of these prototype products will be examined.

Among the other priorities are the following: state of the arts studies of soybean production and use in the LDCs of the tropics and subtropics; increasing individual and thereby institutional response capability through graduate students supporting faculty members on release time; increasing capability for on-campus and on-site training; international soybean personnel talent banking; language training for UIUC-INTSOY staff; soybean information collection, retrieval, and delivery; and service in a leadership role in developing an international network of organizations and individuals oriented toward production and use of soybeans by the rural and urban poor of the tropical and subtropical LDCs.

D. Critical Assumptions

Several assumptions have been made that are important to the attainment of grant objectives. Should one or more prove to be invalid, grant program success will be adversely affected. These assumptions are as follows:

1. That this redesigned 211(d) grant will be supported by AID for a period of three years from October 1, 1975, the effective date of the initiation of the redesigned grant program; however, additional time will be needed to fully attain some of the output objectives.
2. That AID will support a complementary companion 211(d) grant to the University of Puerto Rico, Mayaguez Campus, with emphasis in developing, mobilizing, and maintaining institutional response capability in soybeans with emphasis in crop protection disciplines.
3. That increasing numbers of students from the U.S. Puerto Rico, and the LDCs of the tropics and subtropics will be interested in and supported for graduate study at UIUC in the various aspects of soybean production, marketing and use and that UIUC and other network universities will have the capacity for these students.
4. That LDC country personnel participation in short courses, seminars, workshops, conferences, and special training programs will be supported by a combination of USDA-AID training programs, USAIDs, foundations, and national and international agencies.
5. That AID will support UIUC research on soybean production, marketing, and use for tropical and subtropical areas under separate contractual or other appropriate means.
6. That resources will become available for developing cooperating soybean breeding programs located at national and international centers strategically located in the tropics and subtropics.

7. That AID will assist in development and maintenance of linkages with the LDCs of the tropics and subtropics, in identifying training needs of institutions and individuals and locations for cooperative activities, and in exchange of information in the soybean network.
8. That U.S. international, and LDC institutions will cooperate with UIUC in strengthening of linkages, exchanges, and visits by staff and students, information exchange, and other cooperative activities.
9. That AID will encourage and support UIUC and UPR-MC as the leadership institutions in the international soybean network and will assist in developing and support cooperative research and outreach work on soybeans in cooperation with international research centers with soybean interests.

E. Financial Plan and Budget

The grant budget and life of project cost estimate table shows the annual expenditures by inputs and outputs. Personnel months devoted to the program include the two program co-directors (each on a quarter-time basis), faculty, support staff and graduate assistants.

Grant Budget and Life of Project-Cost-Estimate by Inputs and Outputs

	<u>1st year</u>		<u>2nd year</u>		<u>3rd year</u>		<u>Total</u>	
	<u>Months</u>	<u>Cost</u>	<u>Months</u>	<u>Cost</u>	<u>Months</u>	<u>Cost</u>	<u>Months</u>	<u>Cost</u>
<u>Inputs</u>								
1. Salaries and wages		\$132,770		\$139,020		\$133,405		\$405,195
2. Graduate student stipends		13,200		26,400		28,250		67,850
3. Equipment, materials, supplies		30,500		29,300		24,250		84,050
4. Publications and reports		500		1,500		500		2,500
5. Computer time		750		1,000		1,000		2,750
6. Travel		19,000		15,200		12,425		46,625
7. Other (fringe on 1 and 2)		<u>20,550</u>		<u>22,065</u>		<u>21,255</u>		<u>63,870</u>
Total inputs		\$217,270		\$234,485		\$221,085		\$672,840
<u>Outputs</u>								
I. Education and training	15	\$ 16,505	36	\$ 31,500	36	\$ 33,450	87	\$ 81,455
II. Extended knowledge base	69	148,070	69	150,050	63	134,440	201	432,560
III. Advisory capacity	28	44,650	26	44,685	24	44,745	78	134,080
IV. Linkages and networks	<u>6</u>	<u>8,045</u>	<u>6</u>	<u>8,250</u>	<u>6</u>	<u>8,450</u>	<u>18</u>	<u>24,745</u>
Total by output	118	\$217,270	136	\$234,485	129	\$221,085	384	\$672,840

F. Linkages and Utilization

The linkages in the international soybean network were outlined under Output IV (pages 12-16). All categories of linkages will play important roles in utilizing the strengthened institutional response capability generated by this grant. The following elements will facilitate a continuing utilization of program outputs:

1. Expanded graduate study oriented toward soybean production, protection, marketing and use for the LDCs of the tropics and subtropics contributing to the soybean network personnel pool and to sustained graduate study programs.
2. Improved short course, seminar, and conference training capability both domestically and in tropical and subtropical LDCs.
3. Development of soybean genetic technology for the special environments of the tropics and subtropics.
4. Development of soybean processing technology applicable to home and village scale operations in the tropics and subtropics.
5. Generated knowledge of the opportunities and problems in use of soybean foods by the rural and urban poor as a result of state of the arts studies.
6. Development and maintaining a talent bank of international soybean personnel contributing to maximizing availability and use to meet the needs of tropical and subtropical LDCs.
7. Improved foreign language capability of UIUC-INTSOY and other network personnel making response capability more acceptable and productive in the LDCs.
8. Broadened and deepened expertise in tropical soybean production and use to respond to LDC needs.

9. *Development of a more complete soybean germplasm data bank, reference collections of soybean production hazards, and tropical soybean literature with retrieval and delivery systems.*
10. *Expanded publication and information, production and delivery for soybean workers of the tropics and subtropics.*
11. *Development of an effective network of soybean organizations and individuals, domestically and internationally, to meet the needs for tropical soybean production, protection, marketing, processing, and use among the rural and urban pocr.*

G. Commitment After Grant Expansion

The UIUC has had a long commitment to soybean research, education, and development programs and activities. While the early work was oriented toward U.S. needs, UIUC has shown a commitment to soybean production and use for the LDCs for 10 years. Substantial UIUC personnel and other resources, in addition to those of the U.S. Agency for International Development and the Rockefeller Foundation, have been devoted to the work. The UIUC commitment will continue; however, capitalizing on the full potential developed during the grant period will be dependent, to a large degree, on resources to be made available from U.S. federal sources, foundations, and national and international agencies. Funds will be sought to continue and expand these activities since they contribute materially to UIUCs competence in soybean development and to meeting needs of LDCs. With increasing recognition of the complementarities between soybean production and use, domestically and internationally, it is anticipated that the funding base for support of soybean development work for the tropics and subtropics will be broadened.

Several activities seem certain to be continued with a combination of UIUC and other funds. Among these are the following:

1. Graduate study in soybean production and use with increased tropical orientation providing continuing and improved opportunities for LDC personnel.
2. Training programs in response to needs of the tropical LDCs to be supported by national and international agencies.
3. Soybean breeding programs for tropical environments by national and international organizations as well as UIUC and UPR-MC.
4. Process technology programs to adapt food concepts to indigenous diets by national and international organizations as well as UIUC.
5. The central information systems of soybean personnel, germplasm, reference collections, and literature available on an international basis.
6. The reservoir of faculty, with improved technical and language expertise to provide an array of services to LDC institutions and individuals and to international centers.
7. Continuing mechanisms facilitating soybean research and educational activities on a multidisciplinary, interdisciplinary, problem-solving basis.
8. A more effectively functioning combination of organizations and individuals linked into an international soybean network.

H. Evaluation and Reporting

The experience of almost two years of operations under the grant made the task of planning and detailing the outputs and inputs much easier than would have been the case if the grant were starting from a zero base. Nonetheless the magnitude of the outputs to be achieved under the redesigned grant program is a challenging undertaking, and consultation and review with AID is considered essential to a satisfactory interchange of information on grant progress. It was assumed that the redesigned program would be supported for a minimum of three years

from October 1, 1975; however, some output objectives cannot be fully attained within this period of time indicating the need for consideration of grant extension. At the appropriate times, representatives of UIUC will welcome the opportunity to meet with AID to review and reassess the statement of grant purpose, the specific objectives/outputs to be produced, their magnitude and timing, means of verification of progress and completion, and critical assumptions. At these times, both parties may agree that specific objectives/outputs should change in priority, in scope or direction, or remain as originally proposed. Such a review shall also include a presentation and analysis of UIUC's basic approach and methodology, the need for action by AID or other organizations outside the control of the University, and the need for formal revision of grant terms and conditions.

It is envisioned that at the end of the grant period (a) UIUC in cooperation with other U.S. organizations will be recognized internationally as a center of U.S. excellence for information, expertise and applied research and development capability related to soybean production, protection, and utilization in tropical and subtropical countries; (b) this expertise will be absorbed into the academic mainstream of the University and other appropriate organizations in the U.S. segment of the soybean network; (c) there will be a continuing and significant involvement of the University with LDC and international organizations; and (d) financing will be available for sustaining selected program elements.

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. I Education and training capability

Program subcategory No. 1 Activity Graduate students supporting staff to develop soybean expertise and knowledge response capability.

Staff to be involved Faculty members in areas where tropical-subtropical soybean expertise development is most needed; department graduate committees and staff involved in course and curriculum modification.

Scheduled events/targets Two graduate students added beginning January 1976; two in April 1976; two additional by August 1976; staff identification for expertise development.

Expected results Increased staff with tropical-subtropical soybean expertise; publications on soybean production and use under tropical conditions; M.S. and Ph.D. students completing adding to tropical soybean personnel pool. Selected students at international research centers in support of soybean network programs.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ <u>13,755</u>	\$ <u>27,500</u>
Equipment, materials, supplies	<u>1,000</u>	<u>2,000</u>
Travel	_____	_____
Computer time	<u>250</u>	<u>500</u>
Subcategory total	\$ <u>15,005</u>	\$ <u>30,000</u>
Man months	<u>15</u>	<u>36</u>

Work summary--years 3 through 5 Continuing graduate studies in support of program and to add to tropical soybean personnel pool.

Appendix I-2

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. 1 Education and training capability

Program subcategory No. 2 Activity Seminars, workshops, conferences

Staff to be involved Training officer; UIUC and UPR-MC staff participating in regional workshops.

Scheduled events/targets Evaluate experience of three regional workshops sponsored from February 1974 to February 1976 under AID Research Contract CM/ta-c-73-19; determine needs for and plan for integrated program of seminars, workshops and conferences from 1977 to 1980.

Expected results Evaluation of regional workshops completed; program of seminars, workshops, and conferences planned; specific activities for 1976 and 1977 conducted and evaluated; improved tropical country personnel training; added support from nongrant sources.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ _____	\$ _____
Equipment, materials, supplies	<u>1,000</u>	<u>1,000</u>
Travel	_____	_____
Publications	<u>500</u>	<u>500</u>
Subcategory total	\$ <u>1,500</u>	\$ <u>1,500</u>
Man months	_____	_____

Work summary—years 3 through 5 Offering of integrated program of seminars, workshops, and conferences utilizing increasing institutional response capability; increasing involvement of international soybean network organizations

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. II Extended knowledge base and research capability

Program subcategory No. 1 Activity Development of soybean genetic technology for the tropical and subtropical environments of the LDCs.

Staff to be involved Soybean breeder located in Puerto Rico (1.0); breeder technician (1.0); UIUC and UPR-MC staff in production and protection areas.

Scheduled events/targets Continuous breeding program to generate hybrid populations adapted to tropical and subtropical conditions; increasing cooperation with soybean breeders at selected international centers and national research centers leading to high yielding and more nutritious varieties for the tropics.

Expected results Improved soybean germplasm for tropical-subtropical environments; interchange of germplasm among soybean breeders; progress in developing network of tropical soybean breeders.

Costs and man months:	<u>Year 1</u>	<u>Year 2</u>
Personnel	<u>\$33,520</u>	<u>\$35,720</u>
Equipment, materials, supplies	<u>8,000</u>	<u>8,000</u>
Travel	<u>3,000</u>	<u>3,000</u>
<hr/>		
Subcategory total	<u>\$44,520</u>	<u>\$46,720</u>
Man months	<u>24</u>	<u>24</u>

Work summary—years 3 through 5 This highest priority work will continue with increased linkages with breeding programs at regional and national locations; continuing emphasis on breeding for resistance to yield and nutritional quality depressing factors.

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. II Expanding knowledge base and research capability
 Program subcategory No. 2 Activity Studies of effects of varietal differences
on rehydration and cooking

Staff to be involved Food chemist (4 man months annually); Technician (4 man months
annually); graduate assistants (I-1); hourly help.

Scheduled events/targets Obtain soybean varieties from ISVEX program and other
sources, determine optimal cooking treatments and time.

Expected results As results indicate, report to soybean breeding group to
assist in developing varieties requiring less energy expenditures to prepare for
human consumption.

Costs and man months:	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ <u>10,830</u>	\$ <u>11,580</u>
Equipment, materials, supplies	<u>2,000</u>	<u>2,100</u>
Travel	<u>3,000</u>	<u>3,200</u>
Subcategory total	\$ <u>15,830</u>	\$ <u>16,880</u>
Man months	<u>8</u>	<u>8</u>

Work summary--years 3 through 5 Work will continue as varieties from ISVEX,
preliminary evaluation studies and other sources are tested.

Appendix I-5

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. II Extending knowledge base and research capacity

Program subcategory No. 3 Activity Nutritional evaluations of soy-cereal, soy-fruit mixes, and other prototype soy-based foods.

Staff to be involved Food chemist (5 man months annually); technician (4 man months annually); hourly help.

Scheduled events/targets Protein efficiency ratios (PER) determined on variety of soy based foods; study drying methods.

Expected results Determine effect of processing variables on PER; develop optimal soy-cereal and soy-fruit combinations; develop improved drying techniques.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ <u>12,480</u>	\$ <u>13,340</u>
Equipment, materials, supplies	<u>500</u>	<u>500</u>
Travel	<u>500</u>	<u>500</u>
<u>Nutritional analyses</u>	<u>7,000</u>	<u>5,000</u>
Subcategory total	\$ <u>20,480</u>	\$ <u>19,340</u>
Man months	<u>9</u>	<u>9</u>

Work summary--years 3 through 5 Work will continue but at reduced level as results of first two years activity are integrated into new concepts of soy-food development.

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT---
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. II Extending knowledge base and research capability

Program subcategory No. 4 Activity Development of soybean processing technology; new concepts for high protein and caloric soybean foods for home and village use in LDC's.

Staff to be involved Food processing specialist (6 man months annually); research associate (12 man months annually); technician (4 man months annually); graduate students (I-1); hourly help.

Scheduled events/targets Year 1 - development of concepts, procedures and equipment for rapid preparation of soybean foods and beverage; Year 2 - refine concepts, procedures and equipment; conduct nutritional evaluations.

Expected results Development of scientifically sound concepts and procedures for rapid preparation of home and village use soybean based foods. Introduction of these concepts in LDC programs.

Costs and man months:	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ <u>36,520</u>	\$ <u>39,060</u>
Equipment, materials, supplies	<u>8,500</u>	<u>4,000</u>
Travel	<u>2,500</u>	<u>1,500</u>
Nutritional analyses	<u>--</u>	<u>4,700</u>
Subcategory total	\$ <u>47,520</u>	\$ <u>49,260</u>
Man months	<u>22</u>	<u>22</u>

Work summary--years 3 through 5 Integration of concepts into LDC programs; continued refinement of concepts, processes and equipment.

Appendix I-7

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. II Extended knowledge base and research capability
 Program subcategory No. 5 Activity State of the arts study of use of noncommercially
 processed soybeans for human food at the village and home level for the rural and
 urban poor.

Staff to be involved Home economist and nutritionist (6 man months year 1, 6 man
 months, year 2).

Scheduled events/targets Year 1--plan and integrate study; review literature; identify
 locations where soybeans are processed in villages and homes; visit selected countries
 to determine how soybeans are being used identifying opportunities and constraints
 to use by rural and urban poor. Year 2--complete study.

Expected results Completed study in Year 2 including literature review, assembly of
 literature, preparation of report on soy food uses at home and village level including
 recommendations for future research, education, training, and developmental programs
 to encourage more widespread use of soy foods by rural and urban poor of the LDCs.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ <u>12,720</u>	\$ <u>13,350</u>
Equipment, materials, supplies	<u>1,000</u>	<u>500</u>
Travel	<u>6,000</u>	<u>3,000</u>
Publications, report	--	<u>1,000</u>
Subcategory total	\$ <u>19,720</u>	\$ <u>17,850</u>
Man months	<u>6</u>	<u>6</u>

Work summary--years 3 through 5 Activity to be completed in Year 2.

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. III Advisory capacity

Program subcategory No. 1 Activity Develop and maintain an up-to-date talent bank of institutional and individual capacity and expertise in soybean research, education, and development. Ability to mobilize resources to be improved.

Staff to be involved Clerk-typist (.5); computer programmer (3 months in Year 1 and 1 month in Year 2).

Scheduled events/targets Year 1--Develop system for continuing registry of soybean workers on international scale including study of relevant talent banking experiences and development of computer program; begin collection of information on soybean workers. Year 2--complete system and test for completeness and effectiveness.

Expected results Soybean talent banking system completed in Year 2 and operating on basis desirable for continuation; information being supplied throughout soybean network.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	<u>\$ 6,940</u>	<u>\$ 4,860</u>
Equipment, materials, supplies	<u>1,000</u>	<u>1,000</u>
Travel	<u>--</u>	<u>--</u>
Computer time	<u>500</u>	<u>500</u>
Subcategory total	<u>\$ 8,440</u>	<u>\$ 6,360</u>
Man months	<u>9</u>	<u>7</u>

Work summary--years 3 through 5 Talent bank activity will continue and be maintained with increasing completeness of coverage of soybean professional personnel on international scale.

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT-
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. III Advisory capacity

Program subcategory No. 2 Activity Language training of soybean network personnel

Staff to be involved Staff from UIUC language departments as needed basis; UIUC soybean administrative and core staff and advanced graduate students.

Scheduled events/targets Group Spanish instruction, for core staff, Years 1 and 2; individual French instruction, Year 1, Group French instruction for core staff, Year 2; individual instruction other languages as needed.

Expected results Improved foreign language competency adding to individual and institutional response capability to assist LDCs in soybean research, education, and developmental programs.

Costs and man months:	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ <u>4,620</u>	\$ <u>4,620</u>
Equipment, materials, supplies	<u>500</u>	<u>500</u>
Travel	_____	_____
Subcategory total	\$ <u>5,120</u>	\$ <u>5,120</u>
Man months	<u>4</u>	<u>4</u>

Work summary--years 3 through 5 Continuing need for language training; however, it is anticipated that needs for group training will decline with increasing emphasis on building language capability on individual basis from nongrant funds.

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. III Advisory capacity

Program subcategory No. 3 Activity Salary support for UIUC faculty on release time to increase staff availability for responding to needs of LDCs in development of soybean production, marketing, processing, and use.

Staff to be involved Grant program codirectors (.5); secretary (.25) 6 months faculty release time annually. Some of graduate students in Output I.1. will support faculty members involved.

Scheduled events/targets Identification of UIUC staff members with potential for support of LDC soybean development programs; assignment on release time basis. Overall grant direction will be done under this program subcategory.

Expected results Soybean development response capability in more disciplines with orientation toward needs of LDCs of tropics and subtropics in balanced multi-disciplinary approach; reports and publications from tropical soybean projects completed on release time.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ <u>31,090</u>	\$ <u>33,205</u>
Equipment, materials, supplies	_____	_____
Travel	_____	_____
<u>Subcategory total</u>	\$ <u>31,090</u>	\$ <u>33,205</u>
Man months	<u>15</u>	<u>15</u>

Work summary--years 3 through 5 This program activity will continue in years 3 through 5 with emphasis on mechanisms for increasing availability of personnel in early to mid-career.

Appendix I-II

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. IV Linkages and networks

Program subcategory No. 1 Activity Development of a network of U.S. institutions with interests and capabilities in development of soybeans for LDCs of tropics and subtropics.

Staff to be involved Grant co-directors; UIUC-INTSOY core staff in cooperation with ARS-USDA soybean personnel; support staff linking UIUC and ARS-USDA Northern Regional Soybean Laboratory.

Scheduled events/targets Technician (6 months annually) providing liaison with USDA-ARS germplasm bank of Northern Regional Soybean Laboratory; travel and other communication with other organizations in U.S. network.

Expected results Development of cohesive network of U.S. organizations and individuals oriented to building response capability to assist LDC of the tropics and subtropics in expanded soybean production and use; identification of needs and determine program activities and mechanisms to facilitate continuing cooperation.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	<u>\$ 4,045</u>	<u>\$ 4,250</u>
Equipment, materials, supplies	_____	_____
Travel	<u>1,000</u>	<u>1,000</u>
<u>Subcategory total</u>	<u>\$ 5,045</u>	<u>\$ 5,250</u>
Man months	<u>6</u>	<u>6</u>

Work summary--years 3 through 5 Formalized activity in this subcategory will decline as result of Year 1-2 activities and increasing involvement of many

organizations in the U.S. portion of the network through programs supported by nongrant funds.

Appendix I-12

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. IV Linkages and networks

Program subcategory No. 2 Activity Development of linkages to international research centers and other international organizations.

Staff to be involved Grant co-directors; UIUC-INTSOY core staff.

Scheduled events/targets Development of memoranda of understanding with appropriate international research centers and other international organizations; cooperative program planning and letters of agreement for specific activities; faculty exchanges and development of joint research and outreach capability; advanced graduate student assignments in support of projects.

Expected results Cooperative soybean research and development programs to serve regional and national needs; increased support from national and international/in support of programs; research and training programs, progress toward international soybean network to serve tropics and subtropics.

Costs and man months:

	<u>Year 1</u>	<u>Year 2</u>
Personnel	\$ _____	\$ _____
Equipment, materials, supplies	_____	_____
Travel	<u>3,000</u>	<u>3,000</u>
<u>Subcategory total</u>	<u>\$ 3,000</u>	<u>\$ 3,000</u>

Man months

Work summary--years 3 through 5 Work will expand with increasing cooperative programs with international organizations to meet regional and national needs.

Appendix I-3

WORK PLANS FOR UNIVERSITY OF ILLINOIS 211(d) GRANT--
DEVELOPING RESPONSE CAPABILITY IN SOYBEANS FOR LDCs OF TROPICS AND SUBTROPICS

OUTPUT No. IV Linkages and networks

Program subcategory No. 3 Activity LDC linkages to national agricultural research, education, training, and development organizations interested in expanded soybean production and use.

Staff to be involved UIUC-INTSOY core staff in cooperation with national organizations and personnel.

Scheduled events/targets Cooperative projects on soybean production and use research, training building on ISVEX, training program and regional workshop developed relations; program planning, technical assistance, and project evaluations supported through task order and technical service agreements.

Expected results Use of institutional response capability of UIUC and soybean network by increasing numbers of LDCs; more effective national programs of soybean development for small farm conditions.

Costs and man months:

		<u>Year 1</u>	<u>Year 2</u>
Personnel	Budget included in other grant categories and by funds from other sources.	\$ _____	\$ _____
Equipment, materials, supplies		_____	_____
Travel		_____	_____
<u>Subcategory total</u>		\$ _____	\$ _____
Man months		_____	_____

Work summary--years 3 through 5 Work will continue but with increasing proportions of support from nongrant funds.

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

CERTIFIED A TRUE COPY THIS
10th DAY OF JAN 1975
BY *E. L. Amis*

NOV 14 1974

Dr. J. W. Peltason
Chancellor
University of Illinois
Urbana, Illinois 61801

211(a) Grant U. of Ill.
Subject: Grant No. AID/CM/ta-G-73-49
Amendment No. 1

Dear Dr. Peltason:

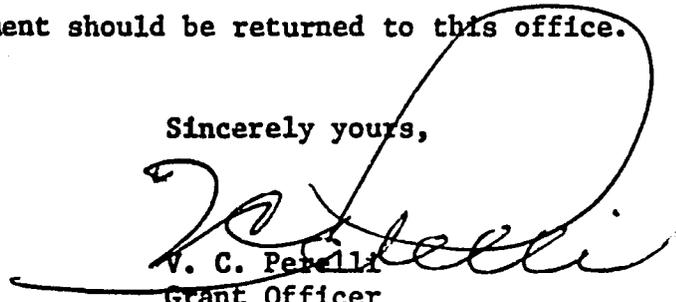
Pursuant to the Foreign Assistance Act of 1961, as amended, subject Grant is hereby amended for the purpose of substituting the attached Standard Provisions, dated October 15, 1974, for those provisions previously applicable.

Therefore, the parties agree that the attached Standard Provisions replace and supersede all previous provisions and that all other terms and conditions of the subject Grant remain unchanged.

Except as expressly amended, the Grant remains in full force and effect in accordance with its terms.

Please sign the original and all copies of this Amendment in the space below to acknowledge your understanding of the conditions under which the amendment has been made. The original and 5 copies of this letter amendment should be returned to this office.

Sincerely yours,

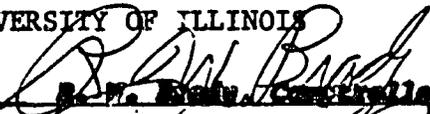


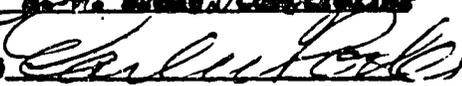
V. C. Perelli
Grant Officer
Technical Assistance Branch
Central Operations Division
Office of Contract Management

Attachment
as stated

~~ACKNOWLEDGED~~: TRUSTEES OF THE

UNIVERSITY OF ILLINOIS

BY: 
R. W. Bush, Controller

WITNESSED: 

DATE: Earl W. Porter, Secretary

ATTACHMENT B
STANDARD PROVISIONS

1. Grant Agreement

The letter to the Grantee, signed by the Administrator, Agency for International Development, (or his Deputy), the Final Proposal as agreed to by the Grant Officer, and the Standard Provisions which have been reviewed and agreed to by the Grantee, constitute the Grant Agreement.

2. Adherence to Aims

The Grantee is responsible for adhering to the conditions of this Grant. Although the Grantee is encouraged to seek the advice and opinion of the Agency for International Development (AID) on special problems that may arise, such advice does not relieve the Grantee from the responsibility for making sound technical and administrative decisions.

3. Budget

In no event may the Grantee be reimbursed in an amount which exceeds the total amount of the Grant. Adjustments among the line items of the budget are unrestricted.

4. Reports

A. The Grantee shall submit an annual report to the sponsoring technical office in the form, manner, and numbers of copies as shall be prescribed by the AID Guideline for Preparation or 211(d) Grant Annual Progress Reports and Submission of Special Reports and Publications, as in effect on the date this Grant is executed. This annual report shall serve as the basis for AID's annual review to determine Grantee's satisfactory accomplishment of Grant objectives and purposes. Findings as a result of the AID review will be conveyed to the Grantee for such actions as the parties deem appropriate.

B. The last annual report to be submitted under the Grant shall serve as the final report, and shall be marked "final report". This report shall be submitted as soon thereafter as possible but no later than six months after completion or termination of the Grant. The final report shall describe all major accomplishments under the Grant, numbers of degrees granted, a bibliography of all publications produced as a result of the Grant, plus other data, as appropriate, sufficient to enable the reader to evaluate all aspects of the program as undertaken.

C. Each annual report shall be accompanied by a Fiscal Report, which shall reach AID no later than 90 days after the end of the reporting year. This report shall reflect expenditures (by budget line items) during the reporting period as well as cumulative expenditures. The

10/15/74

details of the fiscal data shall be set forth in the Guidelines provided by AID. The final fiscal report shall give a summary accounting (by Budget line items) of all funds expended under the Grant.

5. Reviews

AID will conduct on-site reviews and evaluation of Grantee's progress at intervals specified herein.

- A. Initial review within 18 months of grant award date.
- B. Second review within 3 years of grant award date.
- C. Bi-annually thereafter, if extended. Informal visits and progress discussions may be conducted at any time as mutually agreed.

6. Publications

A. If it is the Grantee's intention to identify AID's contribution to any publication resulting from this Grant, the Grantee shall consult with AID on the nature of the acknowledgment prior to publication or whether acknowledgment should be made.

B. The Grantee shall provide the project officer with copies of all published works developed under the grant as set forth in the Guidelines in effect on the date this grant is executed or as subsequently mutually agreed. The Grantee shall provide the project officer with lists of other written work produced under the Grant.

C. In the event Grant funds are used to underwrite the cost of publishing, any profits or royalties up to the amount of such cost attributable to the Grant shall be credited to the Grant.

D. Any copyrights shall be in the name of the Grantee. However, the Government shall have a royalty-free, non-exclusive irrevocable license for the use of all publications produced or composed under this Grant.

7. Patents

A. Grantee agrees to notify the Grant Officer, in writing, of any invention or discovery conceived or first actually reduced to practice in the course of or under this grant. The Grant Officer will determine the patent rights to be afforded the Grantee in accordance with the Presidential Memorandum and Statement of Government Patent Policy 36 FR 16887.

B. Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government under any patent.

8. Salaries

All salaries, wages, fees, stipends, and allowances reimbursed under this Grant shall be in accordance with the Grantee's usual policy and practice.

9. Allowable Costs and Payment

The Grantee shall be reimbursed for direct costs incurred in carrying out the purposes of the Grant. Allowability of such costs shall be determined by the Administrator in accordance with the Federal Management Circular (FMC) 73-8 (Cost Principles for Educational Institutions); the terms of this Grant; or any advance understanding of allowable costs which the Agency has with the institution. It is mutually understood and agreed, unless otherwise provided herein, that the Grantee will not allocate any costs to this Grant, which are normally charged as indirect costs (overhead) in accordance with the Grantee's normal accounting practices. Payment of costs incurred under this grant shall be in accordance with the procedures set forth in Appendix "A".

10. Accounting, Records, and Audit

The Grantee shall maintain books, records, documents, and other evidence in accordance with the institution's usual accounting procedures to sufficiently substantiate charges to the Grant. The Grantee shall preserve and make available such records for examination and audit by AID and the Comptroller General of the United States, or their authorized representatives (1) until the expiration of 3 years from the date of termination of the program and (2) for such longer period, if any, as is required to complete an audit and to resolve all questions concerning expenditures unless written approval has been obtained from the AID Grant Officer to dispose of the records. AID follows generally accepted auditing practices in determining that there is proper accounting and use of Grant funds.

11. Ineligible Countries

Grantee agrees not to initiate grant-financed programs in countries which are subject to the limitation set forth in Section 620 of the Foreign Assistance Act of 1961, as amended, or in countries which are ineligible for assistance under acts appropriating funds for foreign assistance. In the event AID determines that a country is ineligible for assistance, pursuant to this provision the Grant Officer shall notify the Grantee and the Grantee shall commence no further Grant-financed activities in connection with or in such country pending further written advice from the Grant Officer.

12. Unexpended Funds

A. Funds obligated hereunder but not disbursed to the Grantee at the time the Grant expires or is terminated, shall revert to AID. Any

funds disbursed to but not expended by the Grantee and in the custody of the Grantee at the time of expiration or termination of the Grant shall be refunded to AID.

B. If, at any time during the life of the grant, it is determined by the Administrator, AID, that funds provided under the Grant have been expended for purposes not in accordance with the terms of the Grant, the Grantee shall credit such amounts to the corpus of the grant.

C. Expenditures which may be disallowed at time of final audit will be refunded to AID.

13. Procurement of Equipment, Vehicles, Materials, Supplies and Services

A. No vehicles shall be purchased unless prior written approval is obtained from the Grant Officer.

B. Except as may be specifically approved or directed in advance by the Grant Officer, or as provided in paragraph C below, all equipment, vehicles, materials, supplies, and services purchased under this Grant shall be purchased in the United States and, in the case of commodities, shipped from the United States to the country of usage. In addition, for any purchase transaction in excess of \$2,500, the Grantee shall notify the supplier that the item(s) must be of U.S. source and production and comply with the componentry limitations and other requirements applicable to suppliers under AID Regulation 1, and that the supplier must execute and furnish Form AID-282 "Suppliers Certificate and Agreement with the Agency for International Development."

C. Printed or audio visual teaching materials may, to the extent necessary, be purchased with Grant funds outside the United States when:

- (1) effective use of the materials depends on their being in the local language; and
- (2) other funds including U.S. owned and controlled local currencies are not readily available for procurement of such material.

The order of preference as to countries in which such purchases outside the United States are made shall be:

- (1) The AID receiving country.
- (2) Countries falling within AID Geographic Code 901.
- (3) Other countries falling within AID Geographic Code 899.

AID Geographic Codes are defined in AIDPR 7-6.5201-1.

The Grantee shall purchase all English language books from the current AID Contractors providing purchasing services of such material at discount prices, provided, however, that the Grantee may purchase books from other sources if the

terms, price, delivery, and other factors considered, are as good as, or better than those offered by the current AID Contractor. The procedures to be followed, the name and address of the Contractor, and pertinent provisions of the Contract will be provided the Grantee.

D. Procurements in the Cooperating Country which are less than \$2,500.00 and are for materials (regularly available and normally sold on the local market) which are to be consumed or expended in the performance of this Grant, are exempt from the conditions of Paragraph B above, provided that the origin of such materials and supplies and the component parts thereof is a free world country as described in AID Geographic Code 935.

14. Title To and Use of Property

Title to all property purchased with funds to be attributed to this Grant shall vest in the Grantee, subject to the following conditions:

A. The Grantee shall not, under any Government contract or sub-contract thereunder, or any Government grant, charge for any depreciation, amortization, or use of any property title to which remains in the Grantee under the clause.

B. The Grantee agrees to use and maintain the property for the purposes of the Grant.

C. With respect to items having an acquisition cost of \$1,000 or more, title to which vests in the Grantee, the Grantee agrees:

(1) to report such items to the Grant Officer from time to time as they are acquired and to maintain a control system which will permit their ready identification and location.

(2) to transfer title to any such items to the Government in accordance with any written request therefor issued by the Grant Officer at any time prior to final payment under the Grant.

Exceptions to this clause will be as approved by the Grant Officer.

15. Capital Expenditures

Grant funds may not be used for new construction, alterations or improvements to buildings, fixtures, or facilities.

16. Travel and Transportation

A. The Grant Officer hereby approves in advance any international travel hereunder, provided that the Grantee shall obtain written concurrence from the cognizant technical Office in AID prior to sending any individual outside the United States financed under the Grant or

employing any person outside the United States to perform professional and/or supervisory duties under the Grant. For this purpose the Grantee shall advise the cognizant Project Officer at least thirty (30) days in advance of any travel to be undertaken outside the United States, and/or the proposed employment of such persons outside the United States to perform work under the Grant.

After concurrence is received the Grantee shall provide the cognizant USAID mission or U.S. Embassy advance notification, with a copy to the Project Officer of the arrival date and flight identification of Grant financed travellers.

Grantee will not be reimbursed for travel expenses of dependents, or transportation of effects, of foreign nationals brought to Grantee's institution for purposes in furtherance of the objectives of the Grant.

B. Travel to certain countries shall, at AID's option, be funded from U.S.-owned local currency. When AID intends to exercise this option, it will so notify the Grantee after receipt of advice of intent to travel required above. AID will issue a Government Transportation Request (GTR) which the Grantee may exchange for tickets, or AID will issue the tickets directly. Use of such U.S.-owned currencies will constitute a dollar charge to this Grant.

C. The Grantee agrees to travel by the most direct and expeditious route, and to use less-than-first-class transportation unless such use will result in unreasonable delay or increased costs.

(1) All international air travel under this Grant shall be made on United States flag carriers. Exceptions to this rule will be allowed in the following situations provided that the Grantee certifies to the facts in the voucher or other documents retained as part of his Grant records to support his claim for reimbursement and for post audit:

(a) where a flight by a United States carrier is scheduled but does not have accommodations available when reservations are sought;

(b) where the departure time, routing, or other features of a United States carrier would interfere with or prevent the satisfactory performance of official business;

(c) where a scheduled flight by a United States carrier is delayed because of weather, mechanical, or other conditions to such an extent that use of a non-United States carrier is in the Government's interest;

(d) where the appropriate class of accommodations is available on both United States and non-United States carriers, but the use of the United States carrier will result in higher total United States dollar cost to the Grant due to additional per diem or other expenses; and

(e) where the appropriate class of accommodations is available only on a non-United States carrier and the cost of transportation and related per diem is less than the cost of available accommodations of another class on a United States carrier and related per diem.

(2) All international air shipments under this Grant shall be made on United States flag carriers unless shipment would, in the judgment of the Grantee, be delayed an unreasonable time awaiting a United States carrier either at point of origin or transshipment, provided that the Grantee certifies to the facts in the vouchers or other documents retained as part of the Grant records to support his claim for reimbursement and for post audit.

17. Regulations Governing Employees Outside the United States

A. The Grantee's employees, when employed in work overseas, shall maintain institution status and may not rely on local U.S. Government Offices or facilities for support while so engaged.

B. The sale of personal property or automobiles by Grantee employees and their dependents in the foreign country to which they are assigned shall be subject to the same limitations and prohibitions which apply to direct-hire AID personnel employed by the mission, except as this may conflict with host government regulations.

C. Other than work to be performed under this Grant for which an employee or consultant is assigned by the Grantee, no regular or short term employee or consultant of the Grantee shall engage, directly or indirectly, either in his own name or in the name or through an Agency of another person, in any business, profession, or occupation in the foreign countries to which he is assigned, nor shall he make loans or investments to or in any business, profession or occupation in the foreign countries to which he is assigned.

D. The Grantee's employees, while in a foreign country, are expected to show respect for its conventions, customs, and institutions, to abide by its applicable laws and regulations, and not to interfere in its internal political affairs.

E. In the event the conduct of any Grantee employee is not in accordance with the preceding paragraphs, the Grantee's representative responsible for the Grant activities shall consult with the mission director and the employee involved, and upon agreement of these parties, shall adopt a course of action with regard to such employee.

F. The Grantee agrees to abide by the decision of the United States Ambassador to direct the removal from a country of any United States citizen employed under this Grant or to direct the discharge from this Grant of any third country national or foreign country national when, in the discretion of the Ambassador, the interests of the United States so require; and the Grantee further agrees to obtain the written agreement thereto of its employees prior to their being sent overseas.

18. Conversion of United States Dollars to Local Currency

In countries designated "excess" or "near-excess" currency countries Grantee agrees to convert all United States dollars to local currency through the United States Disbursing Officer, American Embassy, unless the Disbursing Officer certifies that no local currency is available.

19. Visa Status of Non-U.S. Citizens

AID will not intercede on behalf of non-U.S. citizens participating in a project when the stay of such non-citizens in the U.S. may be affected by their visa status. It is the responsibility of the Grantee institution to establish, before accepting a non-citizen, that his visa allows him to remain in the country a sufficient length of time to be productive on the project.

20. Grant Officer

All correspondence relating to the terms and conditions of any part of this grant shall be directed to the Grant Officer, Office of Contract Management, Contract Operations Division, AID, Washington, D.C. 20523

21. Amendment

The Grant Agreement may be amended by formal modifications to the basic Grant document or by means of an exchange of letters between the AID Grant Officer and an appropriate official of the Grantee.

22. Termination

This Grant may be terminated by the Administrator upon written notice to the Grantee after consultation between representatives of the Grantor and Grantee. Upon the Grantee's receipt of notice of such termination it shall take immediate action to minimize all additional obligations financed by this Grant and shall cancel such unliquidated obligations wherever possible. No further reimbursement shall be made after the effective day of termination, and the Grantee shall, within thirty (30) calendar days after the effective date of such termination, repay to the Grantor all unexpended portions of funds theretofore paid by the Grantor to the Grantee which are not otherwise obligated by a legally binding transaction with the purposes of this Grant. Should the funds paid by the Grantor prior to termination of this Grant be insufficient to cover the Grantee's obligations pursuant to the aforementioned legally binding transaction, the Grantee may submit to the Grantor within (90) days after the effective date of such termination, a written claim covering such obligations and, subject to the limitations contained in this Grant, the Grantor shall determine the amount or amounts to be paid by the Grantor to the Grantee under such claim.

23. Equal Opportunity Employment

With regard to the employment of persons in the U.S. under this grant, Grantee agrees to take all reasonable steps to insure equality of opportunity in its

employment practices without regard to race, religion, sex, color, or national origin of such persons and that, in accordance with Title VI of the Civil Rights Act of 1964 when work funded by this Grant is performed in the U.S. no person shall, on the grounds of race religion, sex, color, or national origin, be excluded from participation, be denied benefits, or be subjected to discrimination. In addition, the Grantee agrees to comply in accordance with its written assurance of compliance, with the provisions of Part 209 of Chapter II, Title 2 of the Code of Federal Regulations, entitled "Non-Discrimination in Federally Assisted Programs of the Agency for International Development - Effectuation of Title VI of the Civil Rights Act of 1964."

24. Unauthorized Use of Funds

The Grantee shall not expend funds provided under this Grant to pay costs for services or activities which are otherwise financed or funded under any other contractual/grant agreements between the Grantee and any U.S. Federal agency.

25. Nonliability

AID does not assume liability with respect to any claims for damages arising out of work supported by its grants.

26. Covenant Against Contingent Fees

The Grantee warrants that no person or selling agency has been employed or retained to solicit or secure this Grant upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee except bona fide employees or bona fide established commercial or selling agencies maintained by the Grantee for the purpose of securing business. For breach or violation of this warranty, AID shall have the right to cancel this Grant without liability or, in its discretion, to deduct from the Grant amount, or otherwise recover, the full amount of each commission, percentage, brokerage, or contingent fee.

27. Officials Not to Benefit

No member of or delegate to the Congress or resident Commissioner shall be admitted to any share or part of the Grant or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this Grant if made with a corporation for its general benefit.

28. Notices

Any notice given by any of the parties hereunder shall be sufficient only if in writing and delivered to the following:

To AID: Administrator
Agency for International Development
Washington, D.C. 20523
Attention: Grant Officer
Office of Contract Management
Contract Operations Division

To Grantee: At address shown on covering letter

(3) The Grantee shall submit a vendor's invoice or photostat covering each transaction for procurement of commodities, supplies or equipment totaling in excess of \$2,500 appropriately detailed as to quantity, description and price for each individual item of equipment purchased.

(4) The Grantee shall submit a Supplier's Certificate, A.I.D. Form 282, triplicate, executed by the vendor for each transaction in excess of \$2,500.

B. Promptly after receipt of each voucher and statement of dollar cost, the Government shall, except as otherwise provided in this Grant, subject to the provisions of (c) below, make payment thereon as approved by the paying office specified herein.

C. At any time or times prior to final payment under this Grant, the Administrator may have the vouchers and statements of cost audited. Each payment theretofore made shall be subject to reduction for amounts included in the related voucher which are found by the Administrator on the basis of such audit, not to constitute allowable cost. Any payment may be reduced for overpayments, or increased for underpayments, on preceding vouchers.

APPENDIX A

A. At the convenience of the Grantee, but not more often than once a month, the Grantee shall submit to the A.I.D./Washington/Controller/FRD, a Voucher Form SF 1034 (original) and S. 1034(a) in three (3) copies. Each voucher shall be identified by the appropriate A.I.D. Grant number, properly executed, in the amount of expenditures made during the period covered. The voucher forms shall be supported by:

(1) Original and two copies of a certified fiscal report rendered by the Institution in the form and manner satisfactory to A.I.D.

(2) The fiscal report shall include a certification signed by an authorized representative of the Grantee as follows:

"The undersigned hereby certifies: (i) that payment of the sum claimed under the cited Grant is proper and due and that appropriate refund to A.I.D. will be made promptly upon request in the event of disallowance of costs not reimbursable under the terms of the Grant, and (ii) that information on the fiscal report is correct and such detailed supporting information as the cognizant A.I.D. Controller or the Grant Officer may reasonably require will be furnished by the Grantee to A.I.D. upon request.

BY _____

TITLE _____

DATE _____