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PROJECT STATEMENT

**Development of Improved Varieties of Soybeans, Systems
of Pest Management and Postharvest Operations, and
Reduction of Social and Economic Constraints to
Expanded Production and Use**

Project Number: 931-0560

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PROJECT STATEMENT

A. Project Summary.

1. Statistical.

Project Title: Development of Improved Varieties of Soybeans, Systems of Pest Management and Postharvest Operations, and Reduction of Social and Economic Constraints to Expanded Production and Use.

Contractor: The University of Illinois at Urbana-Champaign.

Principle Investigator: Dr. W. N. Thompson, Director, International Soybean Program (INTSOY).

Duration: April 1, 1979 - March 31, 1982.

Total Estimated Cost: \$2,500,000.

Funding:

Prior Years:	\$3,066,460
Project Extension:	
Funding 4/1/79 - 3/31/82	2,500,000
FY 1979	500,000
FY 1980	900,000
FY 1981	1,100,000.

Project Manager: John M. Yohe.

Abstract:

Soybeans offer a greater potential for lessening the LDC protein and calorie shortage than any other grain legume. Soybeans, averaging about 40% 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. Experience in the International Soybean Variety Experiment (ISVEX) indicates that the soybean is a far more widely adaptable legume than was previously thought; satisfactory yields can be obtained over a wide range of agroclimatic conditions following good management and cultural practices.

Recent evidence demonstrates that soybean cultivation is practical under small farm conditions in tropical and subtropical areas, including many regions where protein shortage presently is acute. To accelerate the rate

of expansion, more information is needed on the cultural requirements of the crop in the subtropical and tropical latitudes and on varieties that are needed which are better adapted to short day-lengths and high temperatures. There is continued need to search for varieties exhibiting superior cooking qualities. Work in disease, insect, and weed control through collaborative activities of viral and fungal plant pathologists, entomologists, and weed scientists will continue to focus on an improved knowledge base and management systems for tropical and subtropical environments. Work in progress to develop improved production, harvesting, handling, and storage methods for seed and grain under tropical conditions will continue. Work will be initiated on developing methodology for reducing the social and economic constraints to expanded soybean production and use in the tropical less developed countries.

2. Background.

In April 1973, a 3 year contract was awarded to the University of Illinois at Urbana-Champaign (UIUC) by the Agency for International Development calling on the University to carry out a research and development program directed toward the development of improved varieties of soybeans. The project made satisfactory progress and was approved by the Research Advisory Committee (RAC) for a 3 year extension on January 16, 1976. They reported that the project had made good progress and that the University of Illinois had responded to RAC's concerns over utilization questions. RAC approved the 1976 extension for 3 years, April 1, 1976 - March 31, 1979. They approved the project at that time with the conditions that:

- a. The contractor assign a qualified microbiologist to undertake the research on Rhizobia;
- b. The contractor be responsible for developing varieties or breeding lines having nutritional qualities and acceptability as human food; and
- c. Product development research be separated from the contract.

The University of Illinois complied with that request and these same qualifications are reflected in the present request for contract extension.

The potential and emerging reality of this program supports the original decisions by A.I.D. to support the centrally funded research and development program which was initiated with the University of Illinois in 1973 and supports the relevance of this work toward meeting the food needs of the poorest subsistence rural families in the tropical and subtropical regions of the world.

A. Research Purposes and Objectives

1. Purpose

The purpose to which this project contributes is the development and exploitation of the inherent potential of the soybean as an efficient source of high-quality protein and high-quality edible oil for diets of both the rural and urban poor.

2. Objectives

Six objectives will be addressed by this project. They are varied in nature because of the many immediate problems that need to be solved in achieving the project purpose and because of some of the problems anticipated over the long run. There are relationships between the objectives of such nature that some activities contribute to more than one output.

The objectives are:

Objective 1)--Develop improved genetic materials for use in LDC research and production programs and improved linkages among soybean breeders.

Objective 2)--Improve technology for Rhizobium japonicum production and management under tropical conditions.

Objective 3)--Improve the knowledge base for disease, insect, and weed control in soybeans produced under tropical environments.

Objective 4)--Develop soybean disease, insect, and weed management systems for tropical and subtropical areas.

Objective 5)--Develop improved production, harvesting, handling, and storage methods for seed and grain under tropical conditions.

Objective 6)--Develop methodology for reducing the social and economic constraints to expanded soybean production and use in the tropical less-developed countries.

C. Significance and Rationale for Research

1. Development problem

Soybeans offer a greater potential for lessening the LDC protein and calorie shortage than any other grain legume. The cost of animal protein is rising faster than the average yearly earnings of people in the developing countries and the probabilities of meeting their minimum protein requirements with animal products are remote. If the protein gap is to be narrowed, a major key problem area goal of AID, it will have to be achieved by an increased use of plant proteins. The grain legume crops are the most promising for this purpose and among the grain legumes soybeans rank highest.

2. State of the art

AID has supported problem oriented research on soybean production, protection, marketing and use through the International Soybean Program INTSOY. Accelerated progress has been made toward the development and exploitation of the inherent potential of the soybean as an efficient source of high-quality protein and edible oil for the diets of both the rural and urban poor in developing countries. An array of trials has been developed to identify, evaluate, and speed the process of adoption of improved soybean varieties by producers in tropical and subtropical areas. It is now known that the soybean can be developed to be a high-yielding crop at tropical latitudes. Substantial attention has been given to cultivars which exhibit resistance to diseases. Pathogens that affect seed quality and germination have been intensively studied through cooperative efforts of the Universities of Illinois and Puerto Rico.

Work is underway in soybean microbiology at the subtropical facilities at the University of Puerto Rico, Mayaguez Campus. A collection of Rhizobium japonicum has been made and selected research projects have been initiated.

Interdisciplinary work between plant pathology and entomology personnel features activities in virus disease control. Soybean mosaic virus, cowpea mosaic virus, bean golden mosaic virus, Bacillus subtilis, Phomopsis sojae, and virus vector studies have been the focus of investigations in this area.

Excellent progress has been made in the development of model insect control management systems. Studies on a number of insects affecting soybean production continue. Leadership for weed control studies has been assumed by the colleagues at the subtropical base in Puerto Rico.

Considerable progress has been made in the development of information and dissemination systems to transmit the results of research to soybean scientists worldwide. Three computerized information systems (TAXIR, SIRIC and IRCSA) are utilized in the management and dissemination of knowledge about soybean production, protection and utilization. A publication series, with 15 titles published has been an extremely useful means of informing soybean workers about a wide range of subjects. Training opportunities have been availed by LDC soybean research workers through specialized short courses, graduate training, and specially designed individual study programs. One hundred five students from over 40 countries have participated in two INTSOY-sponsored short courses, Soybean Processing for Food Uses and Technical and Economic Aspects of Soybean Production. In addition, several hundred persons, individually or in groups, have taken part in special programs, seminars, and individual conferences with INTSOY and associated University staff during the past five years, being drawn to soybeans as a tropical food crop by the growing reputation of INTSOY. The relationships that have been established provide a wealth of opportunities for collaborative research, education, and developmental efforts.

D. Plans to Develop Linkages and to Facilitate Utilization of Results.

1. Linkages

The development of linkage mechanisms has been an integral part of the growth of the INTSOY program and its antecedents. The participating institutions of the University of Illinois and the University of Puerto Rico, Mayaguez Campus, serve in a 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, insuring effective utilization of information emanating from the program and contributing to sustaining future soybean development programs for the tropics and subtropics. Linkage development has been generated through means of direct country programs, development of formalized relations with national and international organizations, and the development of organizational relationships with a wide array of institutional entities. In the past five years, INTSOY has instituted two major country development programs to stimulate the production of soybeans by small farmers and the utilization of soybeans in the diet of the rural and urban poor. The first phase of the country program in Sri Lanka, which received funds from UNDP, FAO, UNICEF, and CARE, is nearing completion and the Government of Sri Lanka have recommended that the planned second phase be commenced effective January 1, 1979. A major country program in Peru, funded by USAID, is nearing completion of the first year of its operation. This program is conceived as a four-year program with likelihood of extension into a second phase.

Ten countries have received direct INTSOY professional services through a dozen task orders issued by USAID under Basic Ordering Agreements. These task orders afforded excellent opportunity to link with U.S. and foreign government personnel interested in the development of problem-solving programs to alleviate food production programs in a number of LDCs. Assistance was given to countries in South America, Asia and Africa under these task orders.

INTSOY also participated in direct country support programs sponsored by FAO in Iraq, and in-country financed programs in Saudi Arabia, Ivory Coast, and Venezuela.

INTSOY has demonstrated that administrative mechanisms can be developed for cooperation with a large number of national and international organizations through means of memoranda of understanding. Seven separate memoranda of understanding have been executed. Two are with international agricultural research centers and the remainder are with national organizations devoted to soybean research and development.

INTSOY has also developed relationships with a number of organizations and individuals demonstrating a basic organizational concept of cooperation with all who have interest congruent with the mission to expand the use of soybeans for human food. These relationships include the U.S. government and educational institutions, private sector organizations, and individual scientists. Linkage development activities were given additional impetus from two networking conferences held at Urbana in May, 1977 and March, 1978 to advance the planning process for the development of an "International Soybean Network INTSOY." From these conferences the University of Illinois

and the University of Puerto Rico have taken leadership in moving toward a more formal consortium of institutions committed to international research and educational effort on soybeans. The core group of this consortium include the University of Illinois, the University of Puerto Rico, Iowa State University, the University of Missouri, University of Arkansas, Purdue University, Ohio State University, Kansas State University, Southern Illinois University, North Carolina State University at Raleigh, the University of Georgia, and Mississippi State University. The United States Department of Agriculture has also made a commitment to be associated with this international effort in appropriate ways similar to the close collaboration between the USDA and state research and educational institutions on domestically-oriented work. It is anticipated that a number of other institutions will join in this effort through a combination of formal and informal means.

Utilization

The development of the linkage mechanisms discussed above facilitates the utilization of knowledge generated in the research program. Much of the accumulated knowledge has been published in various forms, annual project reports, articles in professional journals, titles in the INTSOY publication series, and private correspondence and other communications with cooperating scientists.

The major emphasis of developing means to more fully utilize information obtained under the research contract is planned to be concentrated in a separate general technical services agreement, the proposal for which was submitted to USAID in October 1978 as a companion to this research proposal. INTSOY has felt that many of the service elements of the research program that have heretofore been supported from the research contract should more appropriately be included in the GTS agreement, thereby focusing the limited resources available for research on the conduct of problem solving research activities. If the GTS path is followed, most of the utilization activities will be conducted under that agreement and the resources for research requested in this proposal will be focused on problems of soybean production under small farm conditions of the tropics.

One problem area that has not yet been adequately supported is concerned with research on the use of soybeans in the diets of the rural and urban poor of LDCs. A promising start was made on an earlier research contract when certain soy-based prototype foods were developed. However, continuation of that work was not supported in research contract AID/TA/C-1294 and some efforts are being made to fill this crucial gap in the Sri Lanka and Peru country projects referred to earlier. A continuing need exists, however, for research on the development of soybean combination foods, their nutritional quality, and adaptations and strategies required for their acceptance and introduction into diet regimes in the LDCs of the tropics.

E. Management Considerations

INTSOY was established in 1973 with strong support from the Agency for International Development as a program at the University of Illinois and the University of Puerto Rico cooperating with international and national organizations to expand the use of soybeans for human food. INTSOY was formed as a variant of the

international research center concept building on the strength of existing research and educational programs. A.I.D., the Rockefeller Foundation and the Ford Foundation were leaders in this encouragement. The concept has proved to be successful as INTSOY is considered by USAID, FAO/UNDP, U.S. institutions, international agricultural research centers, and LDCs as the international research and education base for soybeans.

A.I.D. has used a combination of instruments to support the INTSOY program including research contracts, companion 211(d) grants to the University of Illinois and the University of Puerto Rico, respectively, basic ordering agreements for technical assistance and training and special grants to conduct international conferences and workshops. The 211(d) grant to the University of Illinois expired September 16, 1978 and a renewal was not requested by the University. The companion 211(d) grant to the University of Puerto Rico was extended for an additional two years. A separate proposal for a general technical services agreement to complement the activities proposed under this research contract has been submitted to A.I.D. by the University of Illinois.

So long as there is a shortage of high-quality protein there will be a necessity for a continuing effort in soybean research and education and the development of the U. S. capacity to respond to interests and assume leadership.

No unusual management problems are expected to arise in connection with this project extension. It is similar in concept and design to the previous centrally funded contract under the same title.

Noncontract funded inputs have been substantial and will continue to be so. This includes cooperation by other staff members, office and laboratory facilities, as well as use of equipment and extensive field facilities.

Management evaluations will be conducted during the year and technical managerial considerations will be under constant monitoring by the A.I.D. project manager.

Contractor will clear all manuscripts proposed for publication with the project manager, and will submit a terminal report within 45 days of the close of the contract year.

F. Project Description and Background.

This project is conceived as an integrated approach to the production, protection, and the utilization of soybeans in the developing countries of the tropics and subtropics. It concentrates on research on technology of production, the development of knowledge of soybean pests and systems to overcome or neutralize them, research on postharvest operations and on reducing social and economic constraints to expanded soybean production and use in protein deficient nations.

The program builds on the strength of previous research and adds the social science dimension to improve our ability to utilize the results of the research in LDC settings.

Previous research has shown that soybeans can be grown, under certain conditions, in many parts of the world. Photoperiod sensitivity can be overcome. Diseases, pests and weeds, while creating special problems, can be controlled.

Improvements in small-scale mechanization, harvesting, and storage processes are possible. People will add soybeans to their diets. A few brief comments on previous research in production technology, pest control, and utilization follow.

The major objectives of the soybean genetic improvement and variety development program include selection for high stable yield and high protein per unit of land area, suitable photoperiod response, resistance to disease and insect pests that limit yield and seed quality, and wide adaptability in tropical and subtropical environments. Most of the work on the breeding program takes place at the subtropical location at the University of Puerto Rico, Mayaguez Campus, where the breeder evaluates the tropical and subtropical soybean germplasm and makes crosses between high yielding temperate and tropically adapted germplasm. The varieties developed in this program are evaluated in the Soybean Preliminary Observation Trial (SPOT) which is conducted at a small number of selected locations around the world. Promising varieties from SPOT are selected for inclusion in the International Soybean Variety Evaluation Experiment (ISVEX). The ISVEX trial provides an opportunity for testing the adaptation of soybean varieties under a wide range of environmental conditions by comparing introduced and locally available cultivars in the countries where trials are conducted. This comprehensive variety testing program depends upon the voluntary collaboration of cooperators of whom over 250, in over a hundred countries, have participated in the past five years. Varieties included in ISVEX have varied over time and have been grouped into early, medium, and late maturing trials as a result of suggestions by cooperators and evaluation by the field coordinator. A new trial was organized in 1978 to tap the pool of germplasm being developed in country soybean programs throughout the world. The trial, the Soybean International Variety Evaluation (SIEVE) includes cultivars developed to the F-6 or later stages and is evaluated at three sites at 2°N, 18°N and 28°N latitudes. In addition to yield, observations are made on agronomic and pest resistant characteristics of these varieties. Selections from the SIEVE trial and from the Puerto Rico breeding program can be entered in the SPOT trial, from which selections are continually being made for inclusion in the ISVEX trial. When the system is fully operative, it is estimated that a variety can move from a breeder to an LDC farmer in a minimum of four years and that all active soybean breeding programs in the world could contribute to the tropical and subtropical genetic improvement program.

A key aspect of the improvement of production technology is the expansion of production and use of Rhizobium japonicum to improve soybean nodulation in the tropics. Nodulation parameters have been determined and the number of R. japonicum necessary to establish satisfactory nodulation in tropical soils is being studied. High soil temperatures are a characteristic of many areas of the tropics and subtropics and may be a detrimental factor to the establishment of R. japonicum in the seed zone. Initial screening of R. japonicum on agar spread plates suggest an optimum temperature of 30°C for rapid and profuse growth. Further research is under way to extend the investigation from agar plate growth to host nodulation at higher temperatures. While peat has been the standard carrier for Rhizobium in inoculant production throughout the world, and provides the best suitable material both from the rhizobial bacterial performance and economic standpoint, alternate carriers will have to be developed because of the general lack of appropriate peat sources in the tropics. Research is under way evaluating the suitability of various alternate carriers. Water content, particle size and organic matter content of potential alternate carriers are being carefully studied.

Research on the generation of knowledge of soybean diseases and insects and systems to control them has covered a wide range of activities. Studies in soybean mosaic virus, cowpea mosaic virus and bean golden mosaic virus are focused on the transmission from white fly to seed. Fungal and bacterial research concentrated on Bacillus subtilis and Phomopsis sojae. Virus vector studies on SHV were conducted in collaboration with pathologists and entomologists. Considerable research was devoted to the development of pest management systems. Promising research continues on the bionomics and spatial distribution of soybean associated thrips. Other studies on field activities of various pests (e.g., Orius insidiosus) are also under way.

In the area of harvest and postharvest technology, breeding for resistance to damage at harvest time is an important part of the breeding program and INTSOY agronomists have worked cooperatively with USDA. INTSOY scientists have conducted research on seed storage technology with work being conducted both at the Urbana campus and in Puerto Rico. Various storage containers were tested under conditions closely approximating those of LDC farmers in tropical conditions. Moisture content of seed at time of storage was determined to be the most significant single factor in preservation of germinability. The rapid loss of germination in storage in the tropics under prevailing conditions was directly related to the percent of moisture level in the seed at the time the seeds were placed in storage. The best containers for storage are those that maintain a low initial moisture content.

Complete reports of these research activities are found in annual reports of contracts AID/TA/C-73-19 and AID/TA/C-1294.

Project Design

The operational design of this project is consistent with work conducted under contracts AID-csd-3292, AID/TA/C-73-19 and AID/TA/C-1294, a design that has been found acceptable to AID. Work under the project will continue to feature the multidisciplinary interinstitutional approach used successfully throughout the INTSOY program. The project will sustain and improve research output and competence in selected areas, will contribute to the generation of knowledge to be shared with soybean scientists of tropical and subtropical developing countries through a companion general technical services agreement and will otherwise improve communications within the international soybean network. The primary thrust will be the improvement of understanding of problems in soybean production, protection and use in the tropical LDCs, development of mechanisms which facilitate effective interdisciplinary and interinstitutional research on problems of soybean development and use in tropical LDCs and the generation of knowledge for dissemination to LDC and international institutions with special emphasis on methods of adaptive research to speed the benefits of research to small farmers and agricultural institutions of tropical LDCs.

Outline of Work

INTSOY will follow a multidisciplinary approach in addressing objectives of the proposal. This approach is well illustrated in the following summary of the outline of work that will be undertaken on each objective. Researchers will cooperate in addressing problems associated with interrelated objectives in a manner that maximizes the effectiveness of limited personnel, facilities and fiscal resources available to the program. Specific activities will be undertaken for each objective as follows:

Objective 1)--Develop improved genetic materials for use in LDC research and production programs and improved linkages among soybean breeders.

The program of screening of new acquisitions for identification of desirable traits will be strengthened. The breeding program will be strengthened in the areas of resistance to soybean pests of the tropics and subtropics and for adaptation to short daylength, earlier maturing varieties with higher yields and varieties tolerant of acid soils and drought stress.

The development of new crosses of soybeans to isolate or incorporate desirable characteristics for tropical and subtropical environments with emphasis on varieties with high stable yield, having good grain and seed quality under humid conditions will continue.

The interaction between varieties and systems of cropping by comparing performance in monoculture and mixed cropping systems will be determined.

INTSOY scientists will determine the interaction of soybean varietal differences and processing conditions as they affect nutritional value of soybean foods. A method will be developed to determine high-protein seeds for use by the breeder to aid in developing high-protein varieties.

Traits will be identified from the wild Glycine germplasm for incorporation into breeding programs for tropical and subtropical environments.

Collaborative research programs among soybean breeders in the developing countries and at international research centers will be strengthened through their involvement in evaluation of promising lines under a wide range of environmental conditions.

The results of the research will be made available to research and extension workers of the tropics and subtropics by assembly, tabulation, interpretation and distribution of results from variety evaluation experiments.

The primary means of improving soybean genetic technology and accelerating the distribution of high yielding tropically adapted cultivars lie in the INTSOY uniform soybean trial system. The three components of the system are SIEVE (Soybean Initial Evaluation Variety Experiment), SPOT (Soybean Preliminary Observation Trial) and ISVEX (International Soybean Variety Experiment). All trials are planted in randomized complete block designs with two replications in the SIEVE, three replications in the SPOT and four replications in the ISVEX. All trials contain the standard variety Williams which serves as a check.

SIEVE features three rows five meters long and 60 cm. apart with a common border row between each plot of the check variety Williams. Complete agronomic data are taken on the middle row of each plot. SIEVE is currently grown at three locations, Boliche, Ecuador (2° s), Isabela, Puerto Rico (18° n) and Gainesville, Florida (28° n), which provide sufficient environmental differences for meaningful comparisons to be made.

General agronomic acceptability is the selection criteria for promotion into SPOT, a trial consisting of 4 rows 4 meters long and 60 cm. apart. Entries have been limited to 14, including the check variety Williams, however in 1978 the number of cultivars was increased to 20.

SPOT varieties exhibiting high yielding capabilities with good agronomic traits are advanced to the ISVEX, consisting of three distinct maturity groupings. Group A, sent to tropical locations, includes cultivars in maturity groups VII through IX. Group B consists of maturity groups VI through VIII and is sent to subtropical locations. Temperate regions receive Group C consisting of cultivars in maturity groups 00 through IV. These are planted in 4 row plots 5 meters long and 60 cm. apart. The inner two rows are used for most data collection., The outer rows act as border rows and also supply plants for nodule ratings.

Objective 2)--Improved technology for Rhizobium japonicum production and management under tropical conditions.

With leadership coming from INTSOY staff stationed at the University of Puerto Rico, Mayaguez Campus, alternative effective inoculant carriers for Rhizobium japonicum, improved methods of application and optimum conditions for storage and transport will be determined.

Field trial studies in the LDCs will focus on the minimum numbers of Rhizobium japonicum needed to produce acceptable nodulation and seed yields under tropical soil conditions.

INTSOY scientists will determine factors affecting Rhizobium japonicum survival and soybean nodulation capabilities by physiological and ecological studies under tropical conditions.

A study will be conducted on the feasibility of incorporating high nitrogenase activity into varieties developed for the tropics by investigation of interaction between varieties and Rhizobium strains.

To determine effective alternate inoculant carriers for R. japonicum various potential carriers will be selected and will be evaluated for presence of rhizobia growth inhibitors. Finely ground carriers will be analyzed for physical particle size distribution, pH, organic matter and various moisture retaining parameters. Inoculants will be prepared for each of the carriers using different cross inoculation groups of rhizobia, R. japonicum-strain 8-0 and cowpea group rhizobia-strain 233 BLR. Immediately after inoculant formation all materials will be sealed in plastic bags and placed in a 35°C. incubation chamber to provide a simulated tropical stress temperature. Periodic sampling for rhizobia counts, bacterial, fungal and actinomycete contamination counts, pH and moisture determination will be performed to determine overall performance of each as a suitable carrier.

To determine minimum numbers of R. japonicum needed to produce acceptable nodulation field trials will be planted at the Isabela Experimental Substation, P.R. in soil having no previous soybean cultivation and free of R. japonicum. Various levels of rhizobial

inoculation will be tried. Ten plants per plot will be dug for nodulation and plant growth determination at approximately 25 and 55 days after planting.

To determine factors affecting R. japonicum survival capabilities under elevated temperatures common in the tropics, several strains are grown on agar plates over an array of temperatures. Temperature tolerant strains are selected for additional evaluation. Parameters considered include the number of days required to obtain a visible colony, an estimate of the average colony diameter after 10 days growth and the number of colonies after 6 days incubation.

Objective 3)—Improve the knowledge base for disease, insect, and weed control in soybeans produced under tropical environments.

Objectives 3 and 4 are perhaps more interrelated than any pair of objectives in this proposal. Under this objective, INTSOY scientists in the Departments of Agronomy, Plant Pathology, and Agricultural Entomology at the University of Illinois and at the Department of Crop Protection at the University of Puerto Rico, Mayaguez, will identify diseases, insects and weeds that have an economic impact on soybean production in the tropics and subtropics.

They will generate information on soybean pathogens, insects and weeds and their interactions to use in monitoring and predicting their impact and spread and for developing effective control measures.

They will evaluate the impact on pathogens, insects and weeds of new production systems that include soybeans and of varieties recommended for the tropics and subtropics.

Considerable attention will be given to the epidemiology of soybean mosaic virus (SMV) and various methodologies will be employed to generate information on seed transmission, plant resistance, variability of virus strains and transmission of aphid and whitefly.

Soybean germplasm lines identified as having low rates of or no seed transmission (SMV) to soybean mosaic virus will be used in tests with several biologically different virus strains to determine if seed transmission rates are independent of virus strain. Seed nontransmission of SMV as a genetic character will be studied to determine its mode of inheritance. Further work on the mechanism of transmission and nontransmission will be carried out (cooperative investigations with USDA grant support) by electron microscopy and cell culture methods to determine the factors that control survival or loss of virus in seed from infected plants.

Studies to determine the mode of inheritance of resistance to soybean mosaic virus discovered by INTSOY in the tropical soybean germplasm will be carried out using conventional plant breeding

The strains of soybean mosaic virus discovered by INTSOY in the germplasm collections will be studied further to determine how they differ in important epidemiological features. Aphid transmission rates, virus/vector relationships, seed transmission rates, and serological differences will be investigated. Surveys for the worldwide incidence of SMV strains will be continued.

Virus spread experiments based on methods developed at INTSOY will be conducted in collaboration with scientists at certain LDC locations. Experiments have been initiated already in Peru and El Salvador. Cooperative work at Illinois (with IAES support) will focus on factors that affect the biology of transmitting aphid species. Trapping and observational approaches are used to monitor the seasonal prevalence of transmitters and the attractiveness of various colors of foliage and usefulness of borders and trap crops for preventing virus spread.

Cooperative studies (with IAES and USDA grant support) will be focused on the relation between plant host cells and the single-stranded DNA of bean golden mosaic virus (BGMV). Isolated plant cell protoplasts will be used to study events in the replication cycle of this novel virus. Molecular hybridization and other analytical techniques will be used to determine the genetic complexity and size of the virus genome. Cooperative work (with IITA, Nigeria) on other legume-infecting whitefly-transmitted viruses will include work on purification and identification, identification of weed or reservoir hosts, and studies on field epidemiology.

Objective 4)--Develop soybean disease, insect and weed management systems for tropical and subtropical areas.

Using information generated from Objective 3, INTSOY scientists will develop cultural, behavioral, biological and chemical methods for controlling soybean pests.

They will participate in the genetic improvement program in identifying and evaluating soybean germplasm for pest resistance and in breeding of tropically-adapted advanced lines.

Information will be integrated on pest complexes, cropping systems and ecological relationships to generate pest management strategies for specific soybean producing regions.

Various methods of cultural, behavioral, biological and chemical control of soybean pests will be employed. Emphasis will be placed on certain aspects of cultural control as they affect field population patterns and build-ups of pest and beneficial species: trap cropping, barriers, row width, date of planting. Target pests will include Ceratomyza spp., aphids, whiteflies, Hedylepta indicata, Etiella zinckenella and stinkbugs. Specifically, trap cropping will be explored vis-a-vis containment of populations of stinkbugs, Ceratomyza spp. and beetle-transmitted viruses; date of plant combined with trap cropping for control

of Etiella zinckenella and whiteflies; date of planting and row spacing for pest complexes and natural enemies, concentrating on mechanisms whereby the soybean plant can escape damage, and barriers for limiting the spread of nonpersistent viruses infecting soybean, e.g. soybean mosaic virus transmitted by aphids. Another area of cultural control to be explored is the effect of clean vs. weedy fields on the build-up and distribution of aphids in the soybean ecosystem.

Emphasis in behavioral control will be placed on canopy color as it affects flight activity and landing behavior of thrips, aphids and leafhoppers on soybean, aluminum mulches as they inhibit landing of aphids, and pheromones for monitoring an early detection of lepidopterous pests, especially Etiella zinckenella.

A crucial area of investigation in biological control is the assessment of the impact of natural enemies on pest complexes. Initial emphasis will be placed on the role of predators in soybean ecosystems, and the use of nonselective pesticides producing resurgence of the pest will be employed in part of this study. Also radioactive labeling of selective prey to determine which predators consume which prey species will be used.

Another aspect of biological control which will be given early attention is in the area of manipulation of insect pathogens. Application of pathogens to control lepidopterous pests and searches for more virulent strains of pathogens will be undertaken.

Emphasis in chemical control will be placed on target-specific (i.e., selective) insecticides and on the impact of low dosage pesticides on target and nontarget species. The idea is to reduce target populations to a level lower than the economic injury level without disproportionately lowering population densities of beneficial organisms. Of special concern is the impact of chemicals on natural enemies, timing of applications, application dosage and the overall environmental effects of chemicals. Oils will be tested also against field spread of soybean mosaic virus by aphids.

Work will be coordinated with the INTSOY entomologist at Puerto Rico. Initial target species will include Etiella zinckenella, Nezara viridula, Anticarsia gemmatilis, Pseudoplusia includens, Cerotoma ruficornis, and aphids.

Objective 5)--Develop improved production, harvesting, handling, and storage methods for seed and grain under tropical conditions.

Investigations will be made of the seed, soil and environmental factors that effect germination and emergence of soybean in tropical soils and environments.

The tillage and planting methods required for rapid, early plant growth will be determined.

Studies will be made to investigate low-cost systems of harvesting to develop practical methods to obtain mature seeds and high quality grain.

Biological and physical factors that affect seed quality and storability, including seed characteristics, temperatures, humidity, insects and disease incidence will be determined.

A model system for small farm storage of seed and grain will be developed.

Research will be conducted on the effects of varietal differences on storability and soy food quality and an investigation of methods of improvement of grain and seed quality through crosses of soybean varieties will be made.

The thrust of this objective is the determination of factors affecting quality of soybean seed and methods to obtain and retain seed of high quality. Plant and engineering sciences will collaborate in a program designed to identify compositional changes and reduction of quality in soybean seed in the field and the harvesting, handling and storage methods required to maintain quality and viability of seed over time. Seed will be measured for oil and protein content and the quality of each will be determined.

Field testing of tillage and planting systems, considering "local practices" prevalent in LDCs will be done in collaboration with LDC cooperators. Recommendations for improvement of indigenous systems will be developed.

On farm storage conditions, including storage containers, moisture levels and storage periods, will be evaluated to determine site-optimal recommendations for improved seed viability. Testing will be done in tropical locations and under controlled conditions on the University of Illinois campus.

Objective 6)--Develop methodology for reducing the social and economic constraints to expanded soybean production and use in the tropical less-developed countries.

Work under this objective will draw heavily from the agricultural social sciences and from the INTSOY Directorate staff. Social science research will complement the research of biological and physical sciences in reducing the constraints to improve the protein calorie use in the developing countries. Prospective food needs in the developing countries will be determined with special consideration given to the role of soy foods in future diets and the economics of domestic production, imports and processing locations.

Research will be conducted on the comparative advantage of soybeans among competing crops estimating supply response to producer prices and studying the role of pricing policy under alternative conditions. Research will also be undertaken on the costs and benefits of alternative kinds and levels of soybean production technologies and social and economic constraints to yield and production increases.

A number of social science methodologies will be employed in determining and analyzing social and economic constraints to expanded soybean production. Data from food consumption surveys and projected food production will be analyzed to identify nutrition gaps that might be filled by soybeans. This requires an understanding of current food consumption and preparation methods. Food balance sheets are one method of macro analysis.

Estimates of potential production and processing costs as compared to import possibilities will be made to ascertain the competitive requirements needed to be met by domestic soybean production and processing. Foreign trade data as well as the foreign exchange position of the country will be analyzed with respect to the likelihood of importing soybeans and/or soy products.

To analyze various aspects of farmers' situations that would help define the kind of production technologies farmers could adopt, surveys may need to be taken to be combined with secondary data on climate, soils, and other physical or biological variables. This analysis would be concerned with characterizing the input supply, output, marketing and production environment of the farm firm. Social data on education levels, land tenure patterns, labor utilization systems, family and kin group needs and obligations, off-farm employment opportunities, and food production - consumption relations would also be required. Budget analysis of alternate production technologies would be done. Smaller linear program models could be built to check on possible labor bottlenecks or other resource use time problems that might occur if farmers used the technology being tested. Preliminary estimates of the availability or prospect of availability of new inputs being tested could be made. On-farm tests to evaluate performance of new technologies should be designed so that an economic analysis could be made of results. Preliminary estimates could be made of the effects the new technology might have on food consumption in the villages, on labor exchange systems, or on adjustments required in landlord tenant agreements.

Surveys of diets and household preparation schemes, and animal feeds will be conducted to estimate the potential role of soybean products in human and animal diets, to estimate the market potential for those soy products and to analyze choices in processing of soybeans.

To estimate comparative advantage of soybeans among competing crops cost of production studies will be made in production

areas where soybeans are technically feasible. These data can also be used in estimating the supply response of soybeans to changing producer prices. Questions of minimum prices needed to generate soybean production will be answered. The real costs of importing soybeans or soy products will be analyzed to determine the limits of domestic price policy. Alternative demand elasticity assumptions will be utilized in estimating effects on consumer prices and government expenditures.

I. Contractor Internal Management and Facilities,

This proposed research program will make available to USAID a broad-based soybean producing and processing state that has given priority to soybean research and educational work in association with both private and public enterprises. This priority, and with the establishment of USDA-supported soybean research at Urbana more than 40 years ago, integrated with that of the University, make the University of Illinois the strongest soybean research and educational center in the world. Associated personnel and support at the University of Puerto Rico, Mayaguez Campus, add a dimension for research in subtropical environments.

The University's soybean orientation towards small farmer environments of the tropics and subtropics and the nutritional deficiency and low-income conditions of the developing countries began in India in 1965 with the initiation of the coordinated soybean research project in association with institution-building projects at two agricultural universities supported by AID as a part of the nationwide agricultural universities development project. The India experience, combined with long established international commitment of the University, led to the decision to establish the University of Illinois Program for International Research, Improvement and Development of Soybeans (PIRIDS) later to become the International Soybean Program, INTSOY. INTSOY was established in 1973 with strong support from USAID as a program of the University of Illinois and the University of Puerto Rico, cooperating with international and national organizations to expand the use of soybeans for human food. The decision to combine efforts of temperate and tropically-based institutions, in a way complementary to their domestic interests, to assist the developing countries of the tropics and subtropics has proved to be a sound one. The University of Illinois and the University of Puerto Rico have taken the leadership in moving toward a more formal consortium of institutions into a proposed international soybean network. The core group of institutions that have made a commitment to a cooperative international research and educational effort on soybeans have been referenced earlier in this proposal.

The management competence of INTSOY, developed, refined and used for more than a decade of international service to soybean research and educational activities, will continue to support this proposed research program. The Director of INTSOY will be directly responsible for management operations. He will be supported by a small administrative staff and will receive policy guidance from an executive committee. The Associate Director of INTSOY, located at the University of Puerto Rico, will continue to give leadership for the day-to-day management of operations conducted at the facilities of that institution.

Facilities at the two institutions are adequate to conduct the required research and are improving. A recently completed addition to the plant sciences building on the University of Illinois campus provides excellent laboratory facilities for the plant pathology group and more closely integrates the Departments of Agronomy and Plant Pathology, now located in the single facility. The facilities development program, now known as the Food Production and Research Program, a multimillion dollar effort to upgrade and expand the research plant facilities of the University at several locations, continues with good support from the agricultural community and the legislature. The existing facilities, e.g., research farms, laboratories, specialized equipment, and the University library, remain at the disposal of the program. A heightened awareness on the campus to involve the agricultural sciences and the social sciences more closely and the development of a nutritional sciences division within the College of Agriculture, drawing on personnel from social sciences, medical sciences, and basic sciences to collaborate with nutritionists in the College of Agriculture's Departments of Animal Science, Dairy Science, and Food Science and with staff from the School of Human Resources and Family Studies will bring new dimensions to the program. This combination of management and facilities resources for research and educational programs and development of outreach capacity cannot be matched anywhere.

J. Key Personnel,

The key person to be identified in any contract emanating from this proposal is Dr. W. N. Thompson, Associate Dean, College of Agriculture, Director, Office of International Agriculture, and Director, International Soybean Program, INTSOY. Dr. Thompson was identified as the key person under research contract AID/TA/C-1294. A copy of his vita is included in Appendix A.

An outstanding professional staff will conduct the work described in previous sections. They include W. H. Judy, Associate Professor of Agronomy; J. A. Jackobs, Professor of Crop Production; R. M. Goodman, Assistant Professor of Plant Pathology; J. B. Sinclair, Professor of Plant Pathology; M. E. Irwin, Assistant Professor of Agricultural Entomology; L. S. Wei, Professor, Food Science; Quyen Nguyen, Assistant Professor of Agronomy; R. Stewart Smith, Assistant Professor of Agronomy; Earl Kellogg, Associate Professor of Agricultural Economics and Frederick Fliegel, Professor of Rural Sociology. Copies of their vitae are included in Appendix A.

K. Environmental Considerations,

Environmental aspects of the International Soybean Program INTSOY have been previously considered by the Agency. The soybean has potential to become one of the world's most important crops. It is high in energy due to high oil and protein content, yet fixes its own nitrogen. This project contributes to the development of improved varieties adapted to tropical conditions in family farming operations which could substantially improve the diets of LDCs without increasing requirements for nitrogen fertilization. This project contributes to the development of model insect, weed and disease management programs which will reduce the need for chemical control measures and will develop varieties which are resistant to major diseases and less susceptible to insect damage.

There is nothing foreseen from the outputs of this project which would adversely affect people, animals, land or the environment in general. Growing more soybeans

on small farms in LDCs will increase the annual output of high quality food per unit of energy input and, with new varieties more resistant to diseases and insects, there will be a decrease in the use of pesticides.

Therefore, typically of crop improvement research projects financed by A.I.D., there are no environmental problems expected from the proposed renewal of this research project nor from adoption of the improved materials.

L. Women in Development.

It is the goal of the INTSOY program to encourage the widest possible participation of soybean workers, broadly defined, in the design and implementation of problem solving projects in soybean production, protection, marketing, and use. The current research contract AID/TA/C-1294 employs women professionals in the Departments of Agronomy, Plant Pathology, and Entomology actively supporting the research work. A continuation of these strategies under this proposed research project is assumed. Overall program requirements to advance knowledge in human nutrition in the development of soybean foods adapted to specific cultures and their acceptance in LDC diets hold great promise for the increased utilization of women in those areas where they have traditionally played a major contributing role.

The University of Illinois has an aggressive affirmative action program to assure opportunities of employment for qualified personnel, including minorities and females, in compliance with Title IX. Each campus in the University of Illinois system has an officer responsible for program implementation under coordination of a general officer of the University. The program is on file with a number of departments of the United States government.

Appendix A

Key Administrative and Scientific Personnel

CONTRACTOR EMPLOYEE BIOGRAPHICAL DATA SHEET

(Submit to Director
to contracting office)

DD FORM 1300-101
34-70000
Approval Expires May 1974

1. NAME (Last, first, middle)
 Mr. Mrs. Miss **Thompson, William Neil**
 University of Illinois
 113 Mumford Hall
 Urbana, Illinois 61801

2. TELEPHONE NO. (Area code)
(217) 399-3277

3. DATE OF BIRTH
Dec. 6, 1920

4. PLACE OF BIRTH
Atlanta, Illinois

5. COUNTRY OF BIRTH
U.S.A.

6. CONTRACTOR'S NAME
University of Illinois

7. CONTRACT NO.
 8. POSITION UNDER CONTRACT

9. PROPOSED SALARY
31700

10. COUNTRY OF ASSIGNMENT
U.S.A.

11. DURATION OF ASSIGNMENT
Indefinite

12. NAME(S) AND ADDRESS OF DEPENDENT(S) TO ACCOMPANY (If applicable)
**Geraldine P. Thompson
(wife) Age 54**

13. EDUCATION (Include all secondary, business college or university training)

NAME AND LOCATION OF INSTITUTION	DEGREE COURSE	CREDITS COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		RECEIVED	REMAINING		
Atlanta, Ill. Com. High School	General secondary	---	---	Dipl.	1937
University of Illinois, Urbana, Ill.	Agriculture	129	---	B.S.	1941
University of Illinois, Urbana, Ill.	Agr. Econ.; Econ.	32	---	M.S.	1942
University of Chicago, Chicago, Ill.	Economics	---	24	---	---
University of Illinois, Urbana, Ill.	Agr. Econ.; Econ	56	---	Ph.D.	1952

14. EMPLOYMENT HISTORY

1. Give last three years. Continue on reverse to list all employment related to duties of proposed assignment.
 2. Salary definition - basic periodic payment for services rendered.
- Exclude bonuses, profit-sharing arrangements, commissions, consultant fees, extra or overtime work payments, overcost differential, or quarters, cost of living or dependent education allowances.

POSITION TITLE	EMPLOYER'S NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Day, Yr.)		SALARY	
		FROM	TO	DOLLARS	PER.
Director, INTSOY Soybean Prog. (INTSOY)	University of Illinois Urbana, Illinois 61801	Nov. 1973	date		
Director, Int'l. Agriculture	University of Illinois Urbana, Illinois 61801	Sept. '78	---		
Professor of Farm Management & Policy	University of Illinois Urbana, Illinois 61801	Feb. 1966	Nov. 1973		
Asst. Vice Chancellor/Research Title XII Officer	University of Illinois Urbana, Illinois 61801	Sept. '78	---		

15. SPECIFIC OBLIGATORY SERVICES (Give last three years)

SERVICE PERFORMED	EMPLOYEE NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Day, Yr.)		DAILY RATE
		FROM	TO	
none				

16. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Fluently	Some	Basic	Fluently	Some	Basic	Fluently	Some	Basic	Fluently	Some	Basic
French						X						
Spanish						X						
German						X						

17. SPECIAL QUALIFICATIONS (Foreign, professional societies, special licenses, publications, research, special skills, and relevant education not previously mentioned; use care in title of list, if necessary)

(See reverse side)

18. CERTIFICATION

To the best of my knowledge the above facts are correct and true and correct.

Signature of Employee
W. N. Thompson

DATE
 March 17, 1976

22

- 16. 1964-1966 - Adviser to Principal, Njala Univ. College (AID Contract)
- 1966-1968 - Leader of University part of the CIC-AID Rural Development Research Project.
- 1969-1970 - Leader of Joint Indo-American Team to develop a method of evaluating progress of Indian agricultural universities and to evaluate Punjab Agricultural University.
- 1954-1955 - Agriculturist, Tennessee Valley Authority.
- 1946-date (except for above) - Engaged in teaching, research, and administration at University of Illinois College of Agriculture in farm management, agricultural policy, and economics of agricultural development.

19. Member Sigma Xi, Alpha Zeta, Gamma Sigma Delta, American Agricultural Economics Association, American and Illinois Societies of Farm Managers and Rural Appraisers, American Economic Association, Society for International Development.

University of Illinois Bronze Tablet (upper 3 percent in scholarship); Farm Foundation Fellow, University of Chicago, 1947-48; Outstanding Ph.D. Thesis Award, American Agricultural Economics Association (1953); University of Illinois College of Agriculture Alumni Association Outstanding Service Award (1959); St. Louis Chamber of Commerce Long Stride Award for Service to Agriculture (1963).

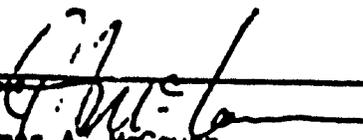
Author of numerous articles, major reports and the following books: Mission Overseas, A Handbook for U.S. Families in Developing Countries (with Harold D. Gulther) University of Illinois Press; Building Institutions to Serve Agriculture (with I. L. Baldwin, J.A. Rigney, R.W. Roskelley) Committee on Institutional Cooperation; AID-University Rural Development Contracts and U.S. Universities (with Harold D. Gulther, Earl H. Ragnier, and Kathleen M. Propp) U.S.A.I.D.; A Method of Assessing Progress of Agricultural Universities in India (with O.P. Gautam, J.S. Patel, and T.S. Sutton) Indian Council of Agricultural Research; The Punjab Agricultural University, An Assessment of Progress to 1970 (with O.P. Gautam, J.S. Patel, and T.S. Sutton) Indian Council of Agricultural Research; NIDA: A Case Study in Institution Development (with Choop Karnjans Prakorn and Lawrence E. McKibbin) International Development Research Center, Indiana University.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one):

- The initial salary proposed herein meets the salary standards prescribed in the contract.
- The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OF REMARKS:

 Thomas A. McCowan	WUI Assistant Director of International Agriculture	DATE March 17, 1976
--	---	------------------------

1. NAME (Last, First, Middle)
 Mr. Mrs. Miss **Judy, William H.**

2. CONTRACTOR'S NAME

3. ADDRESS
 2109 Barberrry
 Champaign, IL 61820

4. CONTRACT NO. **5. CONTRACTOR'S CITY**

6. PROPOSED SALARY **7. CATEGORY OF ASSIGNMENT** **8. DURATION OF ASSIGNMENT**

9. PLACE OF BIRTH
 (217) 598-1111 Married Single Other (Specify)

10. DATE OF BIRTH
 July 20, 1931

11. NATIONALITY
 U.S.A.

12. EDUCATION (Include all secondary, business college or university training)

NAME AND LOCATION OF INSTITUTION	DEGREE TRAINING	CREDITS COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		NUMBER OF CREDITS	COUNT ON FILE		
West Virginia University Martinsburg, West Virginia	Animal Husbandry			B.S.	1955
Michigan State University East Lansing, Michigan	Agr. Exp./Soils Soil Sc. Pl. Phy.			M.S. Ph.D.	1963 1967

13. EMPLOYMENT HISTORY

1. Give last three years. Continue on reverse to list all employment related to duties of proposed assignment.
 2. Salary definition - basic periodic payment for services rendered.

Exclude bonuses, profit-sharing arrangements, commissions, incentive fees, extra or overtime work payments, courses differential, or quarters, cost of living or dependent education allowances.

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Yr.)		SALARY	
		FROM	TO	GRADING	PER.
Associate Professor, Agronomy	University of Illinois Urbana, Illinois 61801	6/1/77	Present		
Research Agronomist Islamabad, Pakistan	Ken Haines Fed. Center Bldg. USDA/ARS/IPD, Hyattsville, Maryland	4/1/75	6/1/77		
Research Agronomist Dar es Salaam, Tanzania	Dr. Steve Eberhart USDA, ARS/IPD Hyattsville, Maryland	5/70	Mar. 75		

14. SPECIFIC CONSULTANT SERVICES (Give last three years)

SERVICES PERFORMED	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Yr.)		SALARY RATE
		FROM	TO	
Research Agronomist	(Tanzania) U.S.D.A. and U.S.A.I.D.	May, 1970	March 1975	
Research Agronomist	(Pakistan) USDA and USAID	April 1975	May 1977	
Agronomist and Soil Scientist	University of Illinois, Urbana, IL.	June 1977	Date	
To review soybean production	FAO/UN - to Iraq	Jan. 1978		

15. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Fluently	Well	Some	Fluently	Well	Some	Fluently	Well	Some	Fluently	Well	Some
	English			X			X			X		
French		X			X			X				
German		X			X			X				
Swahili & Urdu		Slight			Slight			Slight				

16. SPECIAL QUALIFICATIONS (Include professional societies, special training, publications, etc. Do not exceed 1000 characters unless all previously mentioned, and include date of issue, if necessary)

17. CERTIFICATION
 To the best of my knowledge, the above facts are correct and true.

Signature: *William H. Judy* Date: 9/19/78

Signature: *William H. Judy* Date: 9/19/78

FOR CONTRACTOR CERTIFICATION

See Appendix C for recent publications relating to soybean development in tropical and subtropical countries.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one)

- The initial salary proposed herein meets the salary standards presented in the contract.
- The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OR RESEARCH

AUTHORITY	DATE	PAGE

A. CONTRACTOR'S NAME
 Mr. Mrs. Miss **Jackobs, Joseph Alden**
B. CONTRACTOR'S ADDRESS
 12 Persimmon Circle
 Urbana, Illinois 61801
C. CONTRACTOR'S CITY, STATE, AND ZIP CODE
 Urbana, Illinois 61801
D. CONTRACTOR'S PHONE NUMBER
 17-384-8925
E. CONTRACTOR'S SOCIAL SECURITY NUMBER
 10/23/17
F. CONTRACTOR'S PLACE OF BIRTH
 Shell Lake, Wisconsin, U.S.A.
G. CONTRACTOR'S COUNTRY OF BIRTH
 U.S.
H. CONTRACTOR'S EDUCATION
 University of Illinois
I. CONTRACTOR'S CURRENT ASSIGNMENT
 Egypt
J. DURATION OF ASSIGNMENT
 1 month
K. CONTRACTOR'S STATUS
 NONE

L. EDUCATION (Include all secondary, business, college or university training)

NAME AND LOCATION OF INSTITUTION	DEGREE RECEIVED	COURSE COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		RECEIVED	IN PROGRESS		
Shell Lake High School				Diploma	1935
Wisconsin State College, River Falls	Agriculture		96		
University of Wisconsin	Agronomy	64		B.S.	1940
University of Wisconsin	Agronomy	36		M.S.	1943
University of Wisconsin	Agronomy - Genetics	72		Ph.D.	1946

M. EMPLOYMENT HISTORY
 1. Show last three years. Continue on reverse to list all employment related to nature of proposed assignment.
 2. Salary definition - basic periodic payment for services rendered.
 Exclude bonuses, profit-sharing arrangements, commission, incentive fees, extra or overtime work payments, expense differential, or quarters, cost of living or dependent education allowances.

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATE OF EMPLOYMENT (Mo., Yr.)		SALARY	
		FROM	TO	ANNUAL	PER HOUR
Education Advisor	Midwest Universities in International Activities, Madison, Wisconsin	Oct. 73	Oct. 75		
Professor, Crop Production	University of Illinois, Urbana, Illinois	Oct. 75	Present		

N. SPECIFIC CONSULTANT SERVICES (Show last three years)

SERVICE PERFORMED	EMPLOYER NAME AND ADDRESS	DATE OF SERVICE (Mo., Yr.)		GROSS FEE
		FROM	TO	
Project review.	UNDP/New York	May, 78	June, 78	\$135.

O. LANGUAGES PROFICIENT

LANGUAGE	SPEAKS			READS			WRITES			UNDERSTANDS		
	Fluently	Conversational	Basic	Fluently	Conversational	Basic	Fluently	Conversational	Basic	Fluently	Conversational	Basic
English			X			X			X			X

P. SPECIAL QUALIFICATIONS (Foreign, professional, and technical, special interest publications, research, special skills, and other qualifications not previously mentioned, give number to list of facts if omitted)
 Fellow, American Soc. of Agrn
 American Society of Agronomy
 AAAS
 Sigma Xi
 Gamma Sigma Delta

Q. CERTIFICATION
 I certify that the above facts are correct and true and correct to the best of my knowledge.
 Signature: *Joseph Alden Jackobs*
 Title: *Professor*

See Appendix C for recent publications relating to soybean development in tropical and subtropical countries.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one):

- The initial safety proposed levels exceed the safety standards prescribed in the contract.
- The safety levels proposed herein conform to the customary policy and practice for this organization for periodic safety assessments.

B. JUSTIFICATION OR REMARKS:

Contract No.

WUJ

CONTRACTOR EMPLOYEE BIOGRAPHICAL DATA SHEET

to contracting office) 24-00000
Revised 11 June 1973

1. CONTRACTOR'S NAME
 Mr. Mrs. Miss **Goodman, Robert Merwin**

2. CONTRACT NO.
3. POSITION TITLE (Contract)

4. PROPOSED SALARY **5. COUNTRY OF ASSIGNMENT** **6. LOCATION OF ASSIGNMENT**

7. NAMES AND AGES OF DEPENDENTS TO ACCOMPANY (if applicable)

8. EDUCATION (Include all secondary, business college or university training)

9. EMPLOYMENT HISTORY

10. SPECIFIC CONSULTANT SERVICES (Show last three years)

11. LANGUAGE PROFICIENCY

12. CERTIFICATION

Department of Plant Pathology
 University of Illinois
 Urbana, Illinois 61801

12/30/45

Ithaca, New York

U.S.A.

NAME AND ADDRESS OF INSTITUTION	GRADE NUMBER	COURSES COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		NUMBER OF CREDITS	QUANTITY OF CREDITS		
Johns Hopkins University, Baltimore, Md.					
Cornell University, Ithaca, N.Y.				BS	1967-
Cornell University, Ithaca, N.Y.				Ph.D.	1973

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Yr.)		SALARY	
		FROM	TO	DOLLARS	PER CENT
Postdoctoral Fellow	John Innes Institute, Norwich, Engl. Department of Virus Research	1973	1974		
Assistant Professor	Agricultural Experiment Station International Symbion Program Department of Plant Pathology University of Illinois, Urbana, Ill.	1974	1978		
Associate Professor		1978			

SERVICES PERFORMED	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Day, Yr.)		DAILY RATE
		FROM	TO	

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Flu	Good	Basic	Flu	Good	Basic	Flu	Good	Basic	Flu	Good	Basic

13. SPECIAL QUALIFICATIONS (Foreign, professional societies, special training, publications, research, special skills, and relevant education and previously completed, one course title of less, if necessary)

Obtained grants from:
 Rockefeller Fdn. - INTSOY
 Research Board, Grad. Coll. Unit
 of Illinois
 Illinois Crop Improvement Assoc.

14. CERTIFICATION
 To the best of my knowledge, the above facts as stated are true and correct.

Signature of Employee: _____ Date: _____

Awards and Honors: (among others)

NATO Postdoctoral Fellowship in Science, 1973-1974
Danforth Foundation Kent Fellowship, 1972-1973

Professional Societies:

American Association for the Advancement of Science
American Phytopathological Society
Fellowship of Reconciliation
Phi Kappa Phi
Sigma Xi

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check each)

- The initial salary proposed herein meets the salary standards prescribed in the contract.
 The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OR REMARKS:

Signature	Title	Date
-----------	-------	------

1. NAME (Last, First, Middle)
 Mr. Mrs. Miss **Sinclair, James Burton**
 2. ADDRESS (Include Zip Code)
**Department of Plant Pathology
 107C Hort. Field Lab.
 University of Illinois, Urbana, IL.**
 3. TELEPHONE (Area Code)
**(217)
 333-6588**
 4. DATE OF BIRTH
12/21/1927
 5. PLACE OF BIRTH
Chicago, Illinois
 6. COUNTRY OF BIRTH
U.S.A.

7. CONTRACT NO.
 8. POSITION TITLE (Contract)
 9. PROPOSED SALARY
 10. COUNTRY OF ASSIGNMENT
 11. DURATION OF ASSIGNMENT
 12. NAMES AND AGES OF DEPENDENTS TO ACCOMPANY (if applicable)

13. EDUCATION (Include all secondary, business college or university training)

NAME AND LOCATION OF INSTITUTION	DEGREE	COURSES COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		NO. OF COURSES	PERCENT COMPLETED		
Lawrence University - Appleton, Wis.				B.Sc.	1951
University of Wisconsin, Madison, Wis.				Ph.D.	1955

14. EMPLOYMENT HISTORY

1. Give last 10 years. Continue on reverse to list all employment related to duties of proposed assignment.
 2. Salary definition - basic periodic payment for services rendered.

Exclude bonuses, profit-sharing arrangements, stock options, consultant fees, gifts or overtime work payment, overseas differential, or quarters, cost of living or dependent education allowances.

POSITIONS	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Yr.)		SALARY	
		FROM	TO	DOLLARS	PER CENT
Professor	Louisiana State University	1965	1968		
Asst. to the Chancellor	Louisiana State University	1966	1968		
Professor	University of Illinois, Urbana, IL.	1968	Present		

15. SPECIFIC CONSULTANT SERVICES (Give last three years)

SERVICES PERFORMED	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Yr., P.M.)		DAILY RATE
		FROM	TO	
Teaching	At LSU: 2 grad. courses, each sem. 1960-1968			
Teaching	Univ. of Ill: 2 grad. courses, every other year 1968-present			

16. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Fluently	Well	Some	Fluently	Well	Some	Fluently	Well	Some	Fluently	Well	Some

17. SPECIAL QUALIFICATIONS (Foreign, professional societies, special licenses, publications, research, special skills, and relevant education not previously mentioned; use reverse side of form, if necessary)
 (Over)

18. CERTIFICATION
 To the best of my knowledge, the above facts as stated are true and correct.
 SIGNATURE OF EMPLOYEE _____ DATE _____

Listed in:

Who's Who in the Midwest, 1970-present
Community Leaders, 1970, 1973-present
and others.

Member of:

Australian Society of Plant Pathology
Illinois Academy of Sciences
International Seed Testing Assn.
Brazilian Society of Plant Pathology
Association of Official Seed Certifying Agencies
and others.

See Appendix C for recent publications relating to soybean development
in tropical and subtropical countries.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one)

- The initial salary proposed herein meets the salary standards prescribed in the contract.
 The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OR REMARKS:

NAME	TITLE	DATE

AM 10/17/77

CONTRACTOR EMPLOYEE BIOGRAPHICAL DATA SHEET

(Submit in triplicate to contracting SMO/HR)

OSDDET FORM 884 NO. 34-80004 Approved Edition May, 1978

1. NAME (Last, First, Middle)
 Mr. Mrs. Miss **Irwin, Michael Edward**

2. CONTRACTOR'S NAME

3. ADDRESS (Include Zip Code)
 163 Natural Resources Building
 University of Illinois
 Urbana, Illinois 61801

4. EMPLOYER ID **5. POSITION UNDER ESTIMATE**

6. PROPOSED SALARY **7. COUNTRY OF ASSIGNMENT** **8. QUALIFICATION OF ASSIGNMENT**

9. TELEPHONE (Include Area Code)
 (217) 244-6450

10. MARITAL STATUS **Other (Specify)**
 Married Single

11. PLACE OF BIRTH
 Los Angeles, California

12. DATES AND AGES OF DEPENDENTS TO ACCOMPANY IF APPLICABLE

13. COUNTRY OF BIRTH
 U.S.A.

14. EDUCATION (Include all secondary, business college or university training)

NAME AND LOCATION OF SCHOOLS	MAJOR SUBJECTS	CREDITS COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		RECEIVED	QUALIFIED		
University of California, Davis, Calif.	Entomology			BS	1963
Univ. of California, Riverside, Calif.	Entomology			Ph.D.	1971

15. EMPLOYMENT HISTORY

1. Give last three years. Continue on reverse to list all employment related to dates of proposed assignment. **Exclude bonuses, profit-sharing arrangements, commissions, consultant fees, extra or overtime work payments, overcost differential, or quarters, cost of living or dependent education allowances.**

2. Salary definition - basic periodic payment for services rendered.

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Day, Yr.)		SALARY	
		FROM	TO	DOLLARS	PER.
Senior Prof. Off. Entomology	Natal Museum, South Africa		1971		
Asst. specialist	University of Calif., Riverside, Cal.	1970	1971		
Asst. Prof. Agri. Entomology	University of Illinois, Urbana, IL.	1974	Present		

16. SPECIFIC CONSULTANT SERVICES (Give last three years)

SERVICES PERFORMED	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Day, Yr.)		DAILY RATE
		FROM	TO	

17. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Flu.	Good	Basic	Flu.	Good	Basic	Flu.	Good	Basic	Flu.	Good	Basic
Spanish		X										X

18. SPECIAL QUALIFICATIONS (Include professional societies, special license, publications, research, special skills, and relevant education not previously mentioned; use reverse side of form, if necessary)

Dr. Irwin has spent 3 1/2 years in Latin America, a large portion of which was spent in Chile, Argentina and El Salvador - Pan. Mexico.

19. CERTIFICATION

To the best of my knowledge, the above facts as stated are true and correct.

SIGNATURE OF EMPLOYEE _____ DATE _____

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(Use this space for continuation of Blanks 16 and 17)

See Appendix C for recent publications relating to soybean development in tropical and subtropical countries.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one):

- The initial salary proposed herein meets the salary standards prescribed in the contract.
- The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OR REBARKS:

SIGNATURE	TITLE	DATE
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CONTRACTOR EMPLOYEE BIOGRAPHICAL DATA SHEET

(Submit in duplicate to contracting officer)

ORDER NUMBER NO. DA-00044
Approved August Mar, 1970

I. NAME (Last, First, Middle)
 Mr. Mrs. Miss **Lun-Shin Wei**

II. ADDRESS (Street, Box, etc.)
109 South Wing Horticulture Field Lab.

III. CONTACT DATA
1. CONTRACTOR'S NAME
2. CONTRACT NO.
3. PREVIOUS ORDER CERTIFICATE
4. PROPOSED SALARY
5. COUNTRY OF ASSIGNMENT
6. DURATION OF ASSIGNMENT

IV. TELEPHONE NO. (Home)
(217) 313-1870

V. MARITAL STATUS
 Married Single Other (Specify)

VI. PLACE OF BIRTH
Jan. 14, 1929
China

VII. COUNTRY OF BIRTH
Naturalized citizen of U.S.A.

VIII. EDUCATION (Include all secondary, business college or university training)

NAME AND ADDRESS OF INSTITUTION	MAJOR COURSE	COURSE COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		RECEIVED (YEAR)	QUARTER (YEAR)		
Taipei Normal College				B.A.	1946
National Chung-Hsing University				B.S.	1951
University of Illinois, Urbana				M.S.	1955
University of Illinois, Urbana				Ph.D.	1958

IX. EMPLOYMENT HISTORY

1. Give last three years. Continue on reverse to list all employment related to dates of proposed assignment.
 2. Salary definition - basic periodic payment for services rendered.

(Exclude bonuses, profit-sharing arrangements, commissions, consultant fees, extra or overtime work payments, overcost differential, or quarters, cost of living or dependent education allowances.)

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Da., Yr.)		SALARY	
		FROM	TO	DOLLARS	PER.
Assoc. Prof/Dept. of Food Science	University of Illinois Urbana, Illinois	1969	1976		
Professor	Department of Food Science University of Illinois, Urbana		--		

X. SPECIFIC CONSULTANT SERVICES (Give last three years)

SERVICE PERFORMED	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Da., Yr.)		DAILY RATE
		FROM	TO	

XI. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Fluently	Well	Some	Fluently	Well	Some	Fluently	Well	Some	Fluently	Well	Some
Japanese		X			X			X			X	
Chinese			X			X			X			X

XII. SPECIAL QUALIFICATIONS (Patents, professional societies, special licenses, publications, research, special skills, and relevant education not previously mentioned; use reverse side if less, if necessary)

See reverse side

XIII. CERTIFICATION

To the best of my knowledge, the above facts as stated are true and correct.

SIGNATURE OF EMPLOYEE _____ DATE _____

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Awards and Honors:

1. The Education and Research Award from the Land of Lincoln Soybean Association, (1974).
2. President of the Association of Chinese Food Scientists and Technologists in America, (1978-1979).

See Appendix C for recent publications relating to soybean development in tropical and subtropical countries.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one)

- The initial salary proposed herein meets the salary standards prescribed in the contract.
- The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OR REMARKS:

DATE	TITLE	PAGE
------	-------	------

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CONTRACTOR EMPLOYEE BIOGRAPHICAL DATA SHEET

(Submit in triplicate to contracting officer)

OSDS Form No. 24-0004
Approval Expires May, 1976

1. NAME AND TITLE (Last, First, Middle)
 Mr. Mrs. Miss **Quyen Huu Nguyen**

2. CONTRACTOR'S NAME
**University of Illinois
 Department of Agronomy
 Urbana, Illinois 61801**

3. CONTRACTOR'S ADDRESS
 4. CONTRACT NO.
 5. POSITION UNDER CONTRACT

6. PROPOSED SALARY
 7. COUNTRY OF ASSIGNMENT
 8. LOCATION OF ASSIGNMENT

9. NATIONALITY OR STATE (If non-U.S. citizen)
 Married Single Other (Specify)
Vietnam

10. DATES OF ASSIGNMENT
5/24/33

11. STATUS OF EMPLOYEE (Check one)
 Regular Temporary Other
Vietnamese refugee applying for citizenship

12. EDUCATION (Include all secondary, business college or university training)

NAME AND LOCATION OF INSTITUTION	MAJOR SUBJECT	CREDITS COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		RECEIVED	QUANTIFIED		
Mat. Adv. School Ag., Silvi, & An. Husb. Saigon, Vietnam	Agronomy			Ing. Ag.	1964
Univ. Wisconsin - Madison, Wisconsin	Agronomy			MS	1972
Univ. Wisconsin - Madison, Wisconsin	Pl. Breeding & Gen.			Ph.D.	1973
Univ. Kyushu, Japan	Pl. Breeding			Cert.	1974

13. EMPLOYMENT HISTORY

1. Give last three years. Continue on reverse to list all employment related to lines of proposed assignment.

2. Salary definition - basic periodic payment for services rendered.

Exclude bonuses, profit-sharing arrangements, commissions, consultant fees, extra or overtime work payments, overcost differential, or quarters, cost of living or dependent education allowances.

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Yr.)		SALARY	
		FROM	TO	DOLLARS	PERC.
Dir. Ag. Expt. Sta.	Ministry of Agriculture Government of Vietnam	1965	1969		
Res. Assistant	University of Wisconsin	1969	1973		
Chairman, Dept. Agron. Prof. Plant Breeding	University of Can Tho, Vietnam	1973	1977		
Asst. Prof. of Agronomy	University of Illinois, Urbana	1978	--		

14. SPECIFIC CONSULTANT SERVICES (Give last three years)

SERVICE PERFORMED	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Yr., T.J.)		DAILY RATE
		FROM	TO	

15. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Flu.	Good	Basic	Flu.	Good	Basic	Flu.	Good	Basic	Flu.	Good	Basic
Vietnamese			X			X			X			
French			X			X			X			
German	X			X			X			X		
English			X			X			X			

16. SPECIAL QUALIFICATIONS (Degrees, professional societies, special licenses, publications, research, special skills, and relevant education not previously mentioned; use reverse side of form, if necessary)

X American Society of Agronomy
 X American Institute of Biological Sciences
 X (Publications on reverse side)

17. CERTIFICATION

To the best of my best judgment, the above facts as stated are true and correct.

SIGNATURE OF EMPLOYEE _____ DATE _____

3/6

Thesis and Dissertation: Ing. Agr. - "Possibilites de production de semences de pommes de terre a Dalat."

M.S. - Intra-row competition among eleven soybean genotypes.

Ph.D. - Intra-row competition among eleven soybean (Glycine max (L.) Merrill) cultivars.

Published Papers: Irish Potato Seed Production in Dalat, 1964. (Memoir in French)

National College of Agriculture, Saigon, Viet Nam, ---The Effect of Plant Spacing on Several Agronomic Traits of a Soybean Variety Under the Tropical Environment. 1969. (Paper in Korean, English Summary, written with Dr. Shin H. Kwon, F.A.O. of the U.N.). Korean J. Crop Sci. 7: 133-137. Seoul, Korea. -- Soybean Breeding in Vietnam - 1975 (Paper presented at the South East Asian International Symposium on Plant Genetic Resources, March 1975 in Indonesia). Biotrop, Bogor, Indonesia. -- Soybean Breeding in Viet Nam from 1966-1975. Past Results, Present Situation and Future Prospects. - 1977. (Paper in Vietnamese, English, and French Summaries Ministry of Agriculture and Ministry of Universities, Hanoi, Viet Nam.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one):

- The initial salary proposed herein meets the salary standards prescribed in the contract.
 The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OR REMARKS:

SIGNATURE	TITLE	DATE

5A

I. NAME AND ADDRESS OF CONTRACTOR
 Mr. Mrs. Miss **Smith, R. Stewart**
Agricultural Laboratories, Inc.
Columbus, Ohio

II. CONTRACTOR'S NAME

III. CONTRACT NO. **IV. POSITION UNDER CONTRACT**

V. PROPERTY SALARY **VI. COUNTRY OF ASSIGNMENT** **VII. STATUS OF ASSIGNMENT**

VIII. PLACE AND DATE OF BIRTH
IX. PLACE OF BIRTH
X. NATIONALITY
XI. GRADE AND ABILITY OF DEPENDENTS TO ASSIGNMENT (if applicable)

XII. EDUCATION (include all secondary, business college or university training)

NAME AND ADDRESS OF INSTITUTION	MAJOR SUBJECT	COURSE COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		MONTHS	QUARTER		
Michigan State University	Soil Science			BS	1963
Michigan State University	Soil Microbiology			MS	1967
Ohio State University	Soil Microbiology			Ph.D.	1972

XIII. EMPLOYMENT HISTORY

1. Give last three years. Continue on reverse to list all employment related to duties of proposed assignment.
 2. Salary definition - last a periodic payment for services rendered.

Exclude bonuses, profit-sharing arrangements, commissions, consultant fees, extra or overtime work payments, overcost differential, or quarters, cost of living or dependent education allowances.

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATE OF EMPLOYMENT (Mo., Day, Yr.)		SALARY	
		FROM	TO	DOLLARS	PER.
Research Director	Agricultural Laboratories, Inc. Columbus, Ohio	Mar. 1972	Present		

XIV. SPECIFIC CONSULTANT SERVICES (Give last three years)

SERVICE PERFORMED	EMPLOYER NAME AND ADDRESS	DATE OF EMPLOYMENT (Mo., Day, Yr.)		DAILY RATE
		FROM	TO	
INTSOY trip - Peru		9/1975	10/1975	

XV. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Prof	Good	Some	Prof	Good	Some	Prof	Good	Some	Prof	Good	Some

XVI. SPECIAL QUALIFICATIONS (Award, professional societies, special licenses, publications, research, special skills, and other not otherwise indicated on previously mentioned, use reverse side of form, if necessary)

Member:
 American Society of Agronomy
 Soil Science Society of America
 American Society of Microbiology

XVII. CERTIFICATION:
 To the best of my knowledge, the above facts as stated are true and correct.

SIGNATURE OF EMPLOYEE **DATE**

(Use this space for continuation of Blocks 16 and 17)

See Appendix C for recent publications relating to soybean development in tropical and subtropical countries.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one):

- The initial salary proposed herein meets the salary standards prescribed in the contract.
- The salary increase proposed herein conforms to the customary policy and practice for this organization (i.e. periodic salary increases).

B. JUSTIFICATION OR REMARKS:

DATE	TIME	PAGE
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1. CONTRACTOR'S NAME
 Mr. Mrs. Miss **Kellogg, Earl D.**
2. ADDRESS
 305 Mumford Hall
 University of Illinois
 Urbana, IL 61801
3. TELEPHONE
 217-333-1253
4. DATE OF BIRTH
 Nov. 25, 1941
5. PLACE OF BIRTH
 Kansas, U.S.A.
6. COUNTRY OF BIRTH
 U.S.A.

7. CONTRACTOR'S TITLE
8. EMPLOYER'S TITLE
9. PROPOSED SALARY
10. CHARACTER OF ASSIGNMENT
11. DURATION OF ASSIGNMENT
12. SOURCE AND DATE OF INFORMATION TO ADDRESSER (if available)

13. EDUCATION (Include all secondary, business college or university training)

NAME AND LOCATION OF INSTITUTION	MAJOR SUBJECTS	COURSE COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		COURSES COMPLETED	CREDITS/GR		
Kansas State University Manhattan, Kansas	Agriculture and Ag. Econ.	50			
	Economics	10		BS	May 1963
	Mathematics	10			
Michigan State Univ., East Lansing, MI	Agri. Economics		25	Ph.D.	1971
	Economics		25		

14. EMPLOYMENT HISTORY
 1. Show last three years. Continue on reverse to list all employment within 10 years of proposed assignment.
 2. Salary definition - basic periodic payment for services rendered.

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATE OF EMPLOYMENT (Mo., Day, Yr.)		SALARY	
		FROM	TO	DOLLARS	PER ANNU.
Project Specialist	Ford Foundation	Aug. 1975	Aug. 1977		
Multiple Cropping Proj.	New York and Bangkok				
Assoc. Prof. in Ag. Econ. Development	Dept. of Ag. Econ., U. of Ill.	Aug. 1977	present		

15. SPECIFIC CONSULTANT SERVICES (Show last three years)

SERVICES PERFORMED	EMPLOYER NAME AND ADDRESS	DATE OF EMPLOYMENT (Mo., Day, Yr.)		DAILY RATE
		FROM	TO	
Specific consultant services Development of framework for baseline studies in Title XII	BIFAD USAID, Washington	12/20/77	1/20/78	\$125
Research consultant	Ford Foundation, Chiang Mai, Thailand	7/6/78	3/6/78	125
Research consultant	Faculty of Agriculture, Chiang Mai University, Chiang Mai, Thailand	7/16/78	8/16/78	125

16. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Prof.	Good	Fair	Prof.	Good	Fair	Prof.	Good	Fair	Prof.	Good	Fair
	Thai	X									X	

17. SPECIAL QUALIFICATIONS (Show professional societies, special licenses, publications, awards, special skills, and unusual activities not previously mentioned, and names and dates of them, if relevant)
 American Agricultural Economic Assn.
 International Assn. of Ag. Economists
 Selected publications (over)

18. CERTIFICATION
 To the best of my knowledge, the above facts are correct and correct.
 Signature of Employee: *Earl D. Kellogg*
 Date: NOV 9, 1978
 Signature of Contractor: _____
 Date: _____

19. Selected Publications (a full list can be furnished upon request)

A Generalized Simulation Approach to Agricultural Sector Analysis, T. Manetsch, M. Hayenga, A. Halter, T. Carroll, M. Abkin, D. Byerlee, E. Kellogg, G. Johnson. Michigan State University (East Lansing, Mich., 1971).

"Impact of Alternative Policy Strategies on Punjab Agriculture: A Simulation Analysis," R.W. Herdt and E.D. Kellogg. Agricultural Economics Research Report No. 123, Agricultural Experiment Station, Urbana, Illinois, November 1973.

"Viable Alternative for Processing Soybeans in a Variety of Situations," Earl D. Kellogg and Sheldon Williams in Expanding the Use of Soybeans - Proceedings of a Conference for Asia and Oceania, INTSOY Series No. 10, University of Illinois, Urbana, pp. 148-154, February 1977.

"Role of Social Scientists in Cropping Systems Research," Earl D. Kellogg, Proceedings of the First National Conference on Cropping System Research in Thailand, Chiang Mai University, Thailand, June, 1977.

"Measurement of Research Productivity." An invited paper in Proceedings of the Second National Workshop on Agricultural Research Management, Southeast Asian Regional Commission on Agriculture, Kasetsart University, Bangkok, June, 1977.

Farm Level Testing of Cropping Systems - An Economic Analysis of the Multiple Cropping Project Experience, Earl D. Kellogg, Agricultural Economics Research Report No. 2, Department of Agricultural Economics, Chiang Mai University, Chiang Mai, Thailand, December 1977.

CONTRACTOR'S CERTIFICATION (To be completed by responsible representative of Contractor)

A. I hereby certify that (check one):

- The initial salary proposed herein meets the salary standards prescribed in the contract.
- The salary increase proposed herein conforms to the customary policy and practice for this organization for periodic salary increases.

B. JUSTIFICATION OF REMARKS:

1. NAME (Last, first, middle) **Fliegel, Frederick Christian**

2. CONTRACTOR'S NAME

3. CONTRACT NO.

4. POSITION UNDER CONTRACT

5. PROPOSED SALARY

6. DURATION OF ASSIGNMENT

7. DATES OF ASSIGNMENT

8. NAME AND AGE OF DEPENDENTS TO ASSIGNMENT (If applicable)
 Wife, Ruth H., age 44; son, David, 15; daughter, Johanna, 14.

9. EDUCATION (Include all secondary, business college or university training)

NAME AND ADDRESS OF INSTITUTION	MAJOR SUBJECT	CREDITS COMPLETED		TYPE OF DEGREE	DATE OF DEGREE
		UNIVERSITY	COLLEGE		
University of Wisconsin-Madison	Sociology			BA	1949
University of Wisconsin-Madison	Sociology			MA	1952
University of Wisconsin-Madison	Rural Sociology			PhD	1955

10. EMPLOYMENT HISTORY

1. Give last three years. Continue on reverse to list all employment related to a use of proposed assignment.

2. Salary definition - basic periodic payment for services rendered.

Exclude bonuses, profit-sharing arrangements, commissions, consultant fees, extra or overtime work payments, overcost differential, or quarters, cost of living or dependent education allowances.

POSITION TITLE	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Day, Yr.)		SALARY	
		FROM	TO	DOLLARS	PER.
Professor of Rural Sociology and of Sociology	University of Illinois, Urbana, Illinois, 61801	1/63	Present		

11. SPECIFIC CONSULTANT SERVICES (Show last three years)

SERVICE PERFORMED	EMPLOYER NAME AND ADDRESS	DATES OF EMPLOYMENT (Mo., Day, Yr.)		DAILY RATE
		FROM	TO	
Teaching of course in specialty and consultation in program development	Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India	3/77	6/77	\$150 + all expenses

12. LANGUAGE PROFICIENCY

LANGUAGE	SPEAKING			READING			WRITING			UNDERSTANDING		
	Per	Good	Best	Per	Good	Best	Per	Good	Best	Per	Good	Best
German												
Dutch												
English	X						X	X				X
French	X									X		

13. SPECIAL QUALIFICATIONS (Special, professional societies, special licenses, publications, awards, special skills, and relevant education all previously certified; see reverse side of form, if necessary)

Member of various professional societies, author of assorted publications; President of Rural Soc. Society 75-76; Editor, Rural Sociology 70-73; listed Who's Who in America, also in World.

14. CERTIFICATION

To the best of my knowledge, the above facts as stated are true and correct.

Signature of Employee: *Frederick Christian Fliegel*

Date: November 9, 1973

Appendix B

**Summary Budget
Supported by Analyses of Line Item Expenditures and
Objective Category Expenditures**

INSTRUCTIONS TO OFFERORS

- The "Offeror's Analysis of Cost Proposal" form is a standardized statement which an offeror must submit to the Agency for International Development (A.I.D.) in connection with registered procurements. (See AIDPR 7-10.002.)
- Use of this form is mandatory unless the Contracting Officer waives this requirement in writing. Where a particular cost element is not applicable for the procurement, indicate "Not Applicable or 'NA'" on the form.
- The offeror must also submit the supplementary data as detailed in the footnotes on the reverse side.

- By submission of this proposal, the offeror grants to the Contracting Officer or his authorized representative, the right to examine, for the purpose of verifying the cost or pricing data submitted, those books, records, documents, and other supporting data which will permit accurate evaluation of such cost or pricing data, together with the computations and projections used thereon. This right may be exercised in connection with any negotiations prior to contract award.
- The footnotes on the reverse side, in addition to detailing the required supplementary data, provide information which will be of use in completing the "Cost Proposal" below.

I. Salaries <input checked="" type="checkbox"/>		MAN-DAYS	ESTIMATED COST
A. U.S. Personnel			
Home Office Professionals	459		\$ 1,006,555
Home Office Nonprofessionals	396		\$ 487,000
Field Staff Professionals			\$
Field Staff Nonprofessionals			\$
Total U.S. Salaries			\$
B. Contracting or Third Country Nationals			
Field Staff Professionals			\$
Field Staff Nonprofessionals			\$
If these salaries will be paid in U.S. dollars, enter the amount here:			
If these salaries will be paid in local currency, enter the amount and currency below:			
Amount	Currency:		
II. Consultants <input checked="" type="checkbox"/>			
Consultant Fees (Domestic)			\$
Consultant Fees (Overseas)			\$
Total Consultant Fees			\$
III. Fringe Benefits (Payroll Costs) <input checked="" type="checkbox"/>			
			\$ 185,460
IV. Overhead <input checked="" type="checkbox"/>			
Home Office (Overhead)	BASE	RATE	\$ 999,340
Field Staff (Overhead)			\$
Total Overhead			\$ 999,340
V. Travel and Transportation <input checked="" type="checkbox"/>			
U.S. Travel (Personnel and Principals)			\$ 47,750
International Travel (Personnel and Principals)			\$ 127,350
Other Personnel Travel			\$
Transportation of Household Effects, Bicycles & Vehicles			\$
Lease of Household Effects & Vehicles			\$
Other (Specify) International Per Diem			\$ 67,675
Total Travel & Transportation			\$ 242,775
VI. Allowances <input checked="" type="checkbox"/>			
Category			\$
Per Diem			\$
Quarters			\$
Temporary Lodging			\$
Education			\$
Supplemental Travel			\$
Supplemental Pay			\$
Language Instruction			\$
Per Diem			\$
Total Allowances			\$
VII. Other Direct Costs <input checked="" type="checkbox"/> (Specify)			
Computer Exp			\$ 19,000
Office Expenses & Publications			\$ 89,160
Public Relations Summary			\$ 302,450
Total Other Direct Costs			\$ 400,610
VIII. Equipment, Vehicles, Materials and Supplies <input checked="" type="checkbox"/>			
Equipment (Title in contracting country)			\$
Equipment (Title assigned to A.I.D.) Lab & Field			\$ 23,875
Materials and Supplies			\$ 126,170
Vehicles			\$
Fuel			\$ 47,150
Total Equipment, Vehicles, Materials and Supplies			\$ 197,195
IX. Participant Training <input checked="" type="checkbox"/>			
Number of Participants			\$
Training (tuition, fees, etc.)			\$
Travel and Subsistence			\$
Total Participant Training			\$
X. Subcontractors (Specify)			
			\$
Total Subcontractors			\$
XI. Royalties <input checked="" type="checkbox"/>			
			\$

XII. General & Administrative Rate <input checked="" type="checkbox"/>			ESTIMATED COST
Base	Rate	\$	---
XIII. Subtotal (Excluded Cost Exclusive of Fixed Fee or Profit)(Items I-XII)		\$	---
XIV. Fixed Fee or Profit <input checked="" type="checkbox"/>			
Base	Rate	\$	---
XV. Grand Total (Items XIII & XIV)		\$	3,319,975

If more space is required and for items XIV do so where additional information is necessary, please use separate sheets. Leave item number to which answer applies and attach to form.

XVI. Has any government agency performed an audit of your organization within the past 12 months?
 Yes No

XVII. Do you require the use of any government property in performing this contract?
 Yes No (If yes, specify)

XVIII. Are the source of all commodities procured under this contract in the United States?
 Yes No (If not, list the exceptions.)

XIX. Have you performed any contracts for A.I.B. or other government agencies in the past ten years? Yes No (If yes, identify by Agency and contract number: AID/CA-73-17; AID/CA-C-1294; others)

XX. Will you require an advance payment or a Federal Reserve Letter of Credit (to be filled in by educational institutions and nonprofit organizations only).
 Yes No (If yes, in what amount? \$250,000)

XXI. In these any contracts included in this cost proposal?
 Yes No (If yes, specify the contract and what it will be used for.)

XXII. What is the average number of days per year used in the calculation of the above cost proposal for:
 Vacation 23 Wk, Holidays 11, Other (specify) _____
 Sick Leave 23 Wk, Home Leave _____

This proposal, with the supplementary data, is submitted for use in connection with RFP _____ or the proposal titled " _____ " and reflects our best estimate as of this date, in accordance with the instructions to Offerors and Features.

TYPE NAME AND TITLE, SIGNATURE, DATE

NAME, DATE

FOOTNOTES

In addition to the cost analysis on this form, the offeror is required, in good faith, to submit with this form the additional data, supporting schedules, and substantiation which are reasonably necessary for the conduct of an accurate review and analysis in light of the facts of the particular procurement. In order to assess a reasonable and equitable contract price, it is essential that there be a clear understanding of all the existing, verifiable data and the judgmental items applied in compiling from known data to the estimated price. In short, the offeror's supporting process should be clear to the recipient.

The recipient bases its price conditions and assumptions on the basis of the Cost Analysis. The supporting data should include all the following information, unless specified, as well as any other pertinent items:

1. General N. E. Personnel and Contracting or Third Country Personnel

A. An individual is considered a professional if he is engaged in an occupation requiring advanced training in some field of art or science, usually involving manual rather than manual work and who is classified in his field by the standards of the profession. Examples are: professors, teachers, engineers, accountants, economists, and research scientists.

The non-professional category includes those not "trained professional" such as graduate or undergraduate students, secretaries, clerks, etc.

B. What are the general terms in each category? How many non-professionals are included in each category? What is the estimated salary of each category? Will each category include work under this contract on a full-time basis? If not, what percentage of each person's time will be used for work under this contract?

2. Contractors

A. A contractor is a person who serves as an adviser to the Contractor in discharge of his duties and responsibilities.

B. In what form is the cost for contractors' services? How many contractors are included? How many minutes are expended for each contractor? What is the estimated fee per minute for each contractor? (See the fee schedule attached and incorporated into this proposal.)

3. Foreign Benefits

Which foreign benefits are included in the contract? What is the rate of each foreign benefit? Are fringe benefits included in your estimated contract structure? (Specify a rate, if available, of your estimated personnel procedure concerning fringe benefits: allowance, loan, etc.)

4. Overhead

What costs are included in the overhead cost? What overhead costs are included in the overhead cost? What are the rates established by the most recent government audit?

5. Travel and Transportation

Include how many round or one-way trips to where, an estimate of how many departures will be traveling, and the anticipated weight of household effects which will be shipped on each round trip.

6. Allowances

A.I.B. employs the "Standardized Government Travel Regulations" or "Standardized Regulations (Government Customs Package Allowance)" as a basis, in establishing the rate of, and limits for, travel and overseas allowances. If the allowances used in the cost analysis exceed the rates permitted by these Regulations, explain how such allowances are calculated, and how much of each is anticipated. (If a. allowances travel for four destinations, 30 days per round.)

7. Other Direct Costs

Expenditures of other direct costs, such as material, equipment, communications, etc.

8. Government Vehicles, Materials, and Supplies

List the types of government vehicles, materials, and supplies in each category which is not described for use under the contract, and the cost of each.

9. Personnel Training

Where will participants be trained? In what fields will they be trained? What is the tuition for participants? What do the fees cover? How much travel is included? How much is provided for maintenance?

10. Subcontract

What type of work will be subcontracted? Approximately what percentage of the total cost of work is of whom will you subcontract work? What is the estimated amount of each subcontract?

11. If the total cost covered here is in excess of \$250,000, provide on a separate page the following information on each contract item of \$250,000 or more for name and address of contractor, date of contract agreement, nature of contract, contract number, and other data on which the contract is based. This information is provided for the recipient's review and to assist in the recipient's review of the contract. It should include the contract number, name of contractor, and other data on which the contract is based. It should also include the contract number, name of contractor, and other data on which the contract is based.

12. General and Administrative Fee

State, in detail, the process by which you arrived at the General and Administrative Fee.

13. Fixed Fee or Profit

State, in detail, the process by which you arrived at the fixed fee or profit.

14. Source Country

The following conditions shown apply to any commodity procured under the proposed contract by U.S. dollars:

A. The source of the commodity shall be the United States, and the commodity shall have been mined, grown, or through manufacturing, processing, or assembly produced in the United States. The term "source" means the country from which a commodity is procured in the originating country of the originating country if the commodity is required therein at the time of purchase. If, however, a commodity is procured from a free port or bonded warehouse in the form in which it is received, "source" means the country from which the commodity was shipped to the free port or bonded warehouse.

B. A produced commodity purchased in any transaction will not:

1. Contain any component from countries other than Free World countries as defined in A.I.B. Geographic Code 999.
2. Contain components which were imported into the country of production from such Free World countries other than the United States and

10. Each component was obtained by the producer in the form in which they were imported and

(a) All the units of each component listed in the items of production exceed in more than 10 per cent, of each other processes in A.I.B. raw materials, of the lowest cost including the cost of basic transportation and receive imported at which the supplier makes the commodity available for export sale (whether or not financed by A.I.B.).

C. Inspection for Printed or Audio-Visual Teaching Material

The geographic source of teaching materials printed or audio-visual produced in or from foreign countries A.I.B. specifications, may, to the extent necessary, be progressively extended to include the receiving country, Code 991 countries, and Code 999 countries, in addition to the United States when:

1. Effective use of the printed or audio-visual teaching material depends on their being in the local language.
2. Such materials are required for national assistance process or activities financed by A.I.B. in whole or in part.
3. Other funds, including U. S. owned or controlled local government, are not readily available to finance the procurement of such materials.

Geographic Code 999 is defined as "any area or country in the Free World, including the originating country, except when used in a specific amount of A.I.B. financial support, Geographic Code 991 is defined as "any area or country in the Free World, including the originating country, and the originating country, and

Free World countries include: Australia, Belgium, Canada, Denmark, France, Germany, Italy, Japan, Luxembourg, Monaco, Netherlands, New Zealand, Norway, South Africa, Spain, Sweden, Switzerland, and the United Kingdom.

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	1979/80 mm \$	1980/81 mm \$	1891/82	Total mm \$
V. Other Direct Costs	129,000	136,730	144,940	410,670
A. Computer	6,000	6,350	6,730	
B. Office Expenses	10,000	10,600	11,235	
C. Publications	18,000	19,080	20,225	
D. Puerto Rico Op. Supt.	95,000	100,700	106,750	
VI. Equipment, Materials & Supplies	61,300	65,000	68,875	195,175
A. Lab & Field Equipment	7,500	7,950	8,425	
B. Materials & Supplies	39,000	41,350	43,820	
C. Freight	14,800	15,700	16,630	
	<u>\$1,089,080*</u>	<u>\$1,171,325*</u>	<u>\$1,259,570*</u>	<u>\$3,519,975*</u>

* CN/COD will be requested to negotiate the budget to comply with available dollar funds.

Objective Category Budget
April 1, 1979 - March 31, 1982

Objective	1979/80		1980/81		1981/82	
	mm	\$	mm	\$	mm	\$
1. Improved Genetic Mats.	102	342,330	102	367,185	102	396,580
2. <u>Rhizobium</u> Technology	12	98,530	12	105,770	12	113,140
3. Knowledge of Pests	50	193,835	50	209,190	50	225,155
4. Pest Management Systems	34	132,305	34	142,600	34	153,390
5. Seed Improvement	33	144,645	33	155,335	33	167,165
6. Sociological & Economic Constraints	54	177,435	54	191,245	54	204,140
		<u>\$1,089,080*</u>		<u>\$1,171,325*</u>		<u>\$1,259,570*</u>

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* CN/COD will be requested to negotiate the budget to comply with available dollar funds.

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Line Item Budget

April 1, 1979 - March 31, 1982

	1979/80		1980/81		1981/82		Total	
	mm	\$	mm	\$	mm	\$	mm	\$
I. Salaries	285	459,275	285	496,240	285	536,040	855	1,491,555
A. Research/Professional Staff	153	309,275	153	334,240	153	361,040	459	1,004,555
1. Sr. Agron.- Var. Tr.	9	23,900	9	25,940	9	28,020	27	
*2. Agron. Var. Tr., J.P.S.	6	6,440	6	7,585	6	8,160	18	
3. Sr. Breeder - P.R.	12	25,300	12	26,465	12	28,580	36	
4. Agron./Breeder - P.R.	12	16,300	12	17,700	12	19,115	36	
5. Microbiologist	12	28,180	12	30,580	12	33,025	36	
6. Breeder/Agronomist	6	18,575	6	19,540	6	21,100	18	
7. Viral Pathologist	12	24,800	12	26,915	12	29,070	36	
8. Fungal Pathologist	3	9,550	3	10,355	3	11,180	9	
*9. Plant Pathologist, J.P.S.	12	12,665	12	13,745	12	14,840	36	
10. Pest Mgt. Specialist	12	23,220	12	25,210	12	27,230	36	
11. Entomologist, J.P.S.	12	11,600	12	12,600	12	13,515	36	
12. Food Science	3	7,280	3	7,900	3	8,535	9	
13. INTSOY Director	3	10,340	3	11,225	3	12,125	9	
14. INTSOY Assistant Director	3	7,125	3	7,730	3	8,345	9	
15. Ag. Engineer	12	28,000	12	30,250	12	32,700	36	
16. Soybean Pathologist	12	28,000	12	30,250	12	32,700	36	
17. Prod. & Mktg. Economist	12	28,000	12	30,250	12	32,700	36	
B. Support Staff	132	150,000	132	162,000	132	175,000	396	487,000
1. Secretarial (5)	60	50,000	60	54,000	60	58,350	180	
2. Grad. Assistants (6)	72	60,000	72	64,800	72	70,000	216	
3. Wages		40,000		43,200		46,650		
II. Fringe Benefits		56,790		61,375		66,295		184,460
A. Retirement 11.93 of IA & BI		42,860		46,320		50,035		
B. Workmens Comp. .53 of I		2,435		2,630		2,840		
C. HMS 3.2% of IA & BI		11,495		12,425		13,420		
III. Indirect Cost 67% of I		307,715		332,480		359,145		999,340
IV. Travel & Transportation		75,000		79,500		84,275		238,775
A. U.S. Travel		15,000		15,900		16,850		
B. International Travel		40,000		42,400		44,950		
C. Per Diem		20,000		21,200		22,475		

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* Junior Professional Staff (J.P.S.)

Appendix C

**List of Publications Emanating from
Research Contracts AID/ta-c-73-19 and
AID/ta/c-1294, Including Cooperative
Research Partially Funded Under 211(d) Grants
AID/ta-73-49 and AID/ta-73-50**

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Appendix D

Project Logical Framework

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Development of Improved Varieties of Soybeans, Systems of Post Harvest Management and

Post Harvest Operations and Reduction of Social and Economic Constraints to Expanded Production and Use.

Life of Project: _____
 From FY _____ to FY _____
 Total U.S. Funding _____
 Date Prepared: _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>Increased production of soybeans by small farmers of tropical and subtropical LDCs and increased utilization of soybeans for food use by rural and urban poor.</p>	<p>Measures of Goal Achievement:</p> <p>Increase in numbers of LDCs with national programs of soybean production and/or utilization. Improvement of diet of rural and urban poor through increased intake of high quality vegetable protein in a variety of feedstuffs.</p>	<p>Country agricultural statistics Nutritional surveys of LDC diet per Mission and contractor reports</p>	<p>Assumptions for achieving goal targets:</p> <p>LDCs recognize potential nutritional benefits of soybeans and will encourage their production and use in national diet regimes. That AID will support basic and applied research on production, protection, marketing and use of soybeans through INTSOY.</p>
<p>Project Purpose:</p> <p>Development and exploitation of the inherent potential of the soybean as an efficient source of high quality protein and edible oil for diets of the rural and urban poor of the LDCs.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>National programs of soybean production and use in LDCs. Use of improved soybean varieties exhibiting high yield and pest resistance characteristics. Adaptation to local taste preferences of soybean foods and beverages and improvement of nutritional quality of diet regimes.</p>	<p>Reports and agricultural statistics from LDCs, USAID, WFP and international organizations.</p>	<p>Assumptions for achieving purpose:</p> <p>LDCs desire to alleviate chronic protein-calorie diet deficiencies. Soybean offers greater potential for lessening protein-calorie shortage than any other grain legume.</p>
<p>Outputs:</p> <ol style="list-style-type: none"> 1. Improved genetic material 2. Improved <i>R. japonicum</i> technology 3. Improve knowledge base in disease, insect and weed control. 4. Develop disease, insect and weed control systems. 5. Develop production, harvesting, handling and storage methods. 6. Reduce social and economic constraints to expanded soybeans production and use. 	<p>Magnitude of Outputs:</p> <ol style="list-style-type: none"> 1. See 3-a 2. See 3-b 3. See 3-c 4. See 3-d 5. See 3-e 6. See 3-f 	<ol style="list-style-type: none"> 1. See 3-a 2. See 3-b 3. See 3-c 4. See 3-d 5. See 3-e 6. See 3-f 	<p>Assumptions for achieving outputs:</p> <ol style="list-style-type: none"> 1. See 3-a 2. See 3-b 3. See 3-c 4. See 3-d 5. See 3-e 6. See 3-f
<p>Inputs:</p> <p>Research personnel; tech support personnel; graduate and research assistants; program management skills; associated institutions.</p>	<p>Implementation Target (Type and Quantity):</p> <p>See budget</p>	<p>Contractor records Audit by ICA Evaluation reports by USAID Project Manager</p>	<p>Assumptions for providing inputs:</p> <p>AID support for three years.</p>

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NSG 5500-01 00-00
IMPLEMENTS I

PROJECT DESIGN SUMMARY LOGICAL FRAMEWORK

Development of Improved Varieties of Soybeans,
Systems of Pest Management and Post Harvest Operations and Reduction of
Social and Economic Constraints to Expanded Production and Use.

INSTRUCTIONS: THIS IS AN OPTIONAL
FORM WHICH CAN BE USED AS AN ADD
TO ORGANIZING DATA FOR THE PDS
REPORT. IT NEED NOT BE RETURNED
OR SUBMITTED.

Life of Project: _____ to FY _____
From FY _____ to FY _____
Total U.S. Funding: _____
Date Prepared: _____

PAGE 1

NARRATIVE SUMMARY

Region or Sector Goals: The broader objective to which this project contributes:

Increased production of soybeans by small farmers of tropical and subtropical LDCs and increased utilization of soybeans for food use by rural and urban poor.

OBJECTIVELY VERIFIABLE INDICATORS

Measures of Goal Achievement:

Increase in numbers of LDCs with national programs of soybean production and/or utilization.

Improvement of diet of rural and urban poor of LDCs through increased intake of vegetable (soybean) protein in variety of foodstuffs.

MEANS OF VERIFICATION

Country agricultural statistics.

Nutrition surveys of LDC diet patterns.

Mission and contractor reports.

IMPORTANT ASSUMPTIONS

Assumptions for achieving goal targets:

That LDCs of the tropics and subtropics recognize the potential nutritional benefits of soybeans and will encourage their production and use in national diet regimes.

That LDCs will allocate resources to development of integrated national programs.

That AID will continue to support basic and applied research on the production, protection, marketing and use of soybeans through the International Soybean Program (ISAP).

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Development of Improved Varieties of Soybeans, Systems of Post Harvest Management and Post Harvest Operations and Reduction of Social and Economic Constraints to Expanded Production and Use.

LOGICAL FRAMEWORK

Life of Project _____
 From FY _____ to FY _____
 Total M. & P. Funding _____
 Base Funding _____
 No. _____

NARRATIVE SUMMARY	QUANTITATIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose</p> <p>The purpose to which this project contributes is the development and exploitation of the inherent potential of the soybean as an efficient source of high quality protein and edible oil for the diets of the rural and urban poor in tropical LDCs.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>National programs of soybean production and utilization in LDCs</p> <p>Use of improved varieties developed through research exhibiting high yield characteristics and resistance to diseases and pests.</p> <p>Adaptation to local taste preferences of soybean-based foods, and beverages with corresponding improvement of nutritional quality of diet regimes.</p>	<p>Reports and agricultural statistics from LDCs, UNIAID, USDA and international organizations.</p> <p>Publication of results of adaptive research in journals and periodicals; sharing of germplasm among countries with similar agro-climatic conditions.</p> <p>Noticeable disappearance of soybean crop into indigenous utilization channels; strong local market for farmers produce; publication of books, manuals, etc. on preparation and use of soybeans; improved physical and mental capacity of youth traceable to increased protein intake.</p>	<p>Assumptions for underlying purposes:</p> <p>That LDCs want to alleviate their chronic shortage of proteins and calories in the diets of their rural and urban poor.</p> <p>That soybean offers a greater potential for lessening the LDC protein and calorie shortage than any other grain legume.</p> <p>That support for research and technology transfer will be supported by UNIAID through this and other complementary projects.</p> <p>That additional resources will be available from national and international organizations.</p>

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PROJECT DESIGN SUMMARY

Development of Improved Varieties of Soybeans, Systems of Pest Management and Post Harvest Operations and Reduction of Social and Economic Constraints to Expanded Production and Use.

LOGICAL FUNDAMENTALS

Life of Project _____
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ESSENTIAL ASSUMPTIONS
<p>Output:</p> <p>1. Develop improved genetic materials for use in LEC research and production programs and improved linkage among soybean breeders.</p>	<p><i>Magnitude of Output:</i></p> <ol style="list-style-type: none"> 1. Strengthened program of screening of new acquisitions for identification of desirable traits 2. Development of new crosses of soybean that isolate or incorporate desirable characteristics for tropical and subtropical environments with emphasis on varieties with high stable yields which have good grain and seed quality under humid conditions. 3. Assessment of the interaction between varieties and cropping systems through comparison of performance in monoculture and mixed cropping systems. 4. Assessment of the interaction of varietal differences and processing conditions as they affect nutritional value of soybeans. 5. Incorporation of wild <i>Glycine</i> germplasm into breeding program. 6. Strengthened collaborative research programs in LECs and at international agricultural research centers. 7. Availability of research results to research and extension workers of LECs. 	<ol style="list-style-type: none"> 1. Improved characteristics of breeding materials for small farm use. 2. Hybrid populations developed having high stable yields and good seed quality. 3. Recommended practices of cropping patterns issued. 4. Inclusion of varieties having superior processing qualities and minimal nutritional loss in breeding program. 5. Interaction of INTSOV staff with LEC researchers and staff at international agricultural research centers. <p>No. of published materials by LEC research and extension workers in their national programs.</p>	<p><i>Assumptions for achieving outputs</i></p> <p>That considerable research on varietal improvement for LECs of the tropics remains to be done.</p> <p>That LEC farmers will adopt economically optimal cropping systems.</p> <p>That there are varieties more amenable to processing without diminishing nutritional quality of the product.</p> <p>That certain characteristics of wild <i>Glycine</i> are desirable for inclusion in improved varieties.</p>

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AND 1959-60 SUPPLEMENT I

PROJECT DESIGN SUMMARY

LUCICAL PROJECTS

Development of Improved Varieties of Soybeans, Systems of Pest Management and Post H
 Project Title & Number: Operations and Reduction of Social and Economic Constraints to Expanded Production of

Life of Project: _____
 From FY _____ to FY _____
 Total U.S. Funding: _____
 Date Proposed: _____

PA

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ESSENTIAL ASSUMPTIONS
<p>Output:</p> <p>11. Improve technology for <u>Brazilian japonicum</u> production and management under tropical conditions.</p>	<p>Dependence of Outputs:</p> <ol style="list-style-type: none"> 1. Production of alternate efficient carriers for <u>B. japonicum</u>, methods for application and optimum conditions for storage and transport. 2. Assessment of the feasibility of incorporating high nitrogenase activity into improved varieties. 3. Determination through LBC field trials of minimum numbers of <u>B. japonicum</u> necessary for acceptable seed nodulation. 4. Completion of physiological and ecological studies to determine factors affecting <u>B. japonicum</u> survival and soybean nodulation capabilities. 	<ol style="list-style-type: none"> 1. Use of alternate <u>Brazilian</u> carriers; adoption of recommendations for application. 2. Increased nodulation on soybean plants in varying environmental conditions within the tropics and subtropics. 	<p>Assumptions for antibody output:</p> <p>Yield of soybeans is greater with application to <u>B. japonicum</u> to increase fixation of nitrogen.</p> <p>LBC farmers will apply <u>B. japonicum</u> as yield differences are perceptible.</p> <p>Performance of <u>B. japonicum</u> in the tropics and subtropics can be improved through development of hardier strains than can withstand the higher soil temperatures found in the tropics.</p>

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AD 434-10-01
REPLACEMENT 1

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Development of Improved Varieties of Soybeans, Systems of Pest Management and Post Harvest Operations
Project Title & Forward Statement of Social and Economic Contributions to Expanded Production and Use.

Life of Project _____
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared _____

PAGE 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Outputs</p> <p>III. Improve the knowledge base for disease, insect and weed control in soybeans produced under tropical environments.</p>	<p>Elements of Outputs:</p> <ol style="list-style-type: none"> 1. Identification of diseases, insects and weeds that have an economic impact on soybean production in the tropics and subtropics. 2. Generation of information on soybean pathogens, insects and weeds and their interactions for use in monitoring and predicting their impact and spread and for developing effective control measures. 3. Evaluation of the impact on pathogens, insects and weeds of new productive systems that include soybean varieties recommended for the tropics and subtropics. 	<ol style="list-style-type: none"> 1. Flow of information to LEC research and extension workers on arrays of diseases, pests and weeds affecting soybean production. 2. Use of generated information by LEC researchers, in collaboration with INTSOV and other scientists, in developing pest management systems. 	<p>Assumptions for achieving outputs:</p> <ol style="list-style-type: none"> 1. Pests, broadly defined, are a serious impediment to the increased production of soybeans in tropical environments. 2. A worldwide system of collecting information on soybean pests and making that information available will contribute to more rapid improvement in soybean production. 3. Researchers and extension workers in LECs will cooperate and participate in a worldwide knowledge generation network.

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AG 102-21-0004
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LUSICAL FINANCIALS

Life of Project
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared _____

Development of improved varieties of soybeans, systems of pest management and post harvest operations
Project Title & Number: and Reduction of Social and Economic Constraints to Expanded Production and Use

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Output</p> <p>IV. Develop soybean disease, insect and weed management systems for tropical and subtropical use.</p>	<p>Magnitude of Output</p> <ol style="list-style-type: none"> 1. Development of cultural, behavioral, biological and chemical methods for controlling soybean pests. 2. Participation in the genetic improvement program through identification and evaluation of soybean germplasm for pest resistance. 3. Development of pest management strategies for specific soybean producing regions. 	<ol style="list-style-type: none"> 1. Decline in economic losses to soybean farmers in tropical LDCs due to pest infestation. 2. Release of breeding material with characteristics of resistance to selected soybean pests. 3. Adoption by LDCs of pest management programs designed for specific production areas. 	<p>Assumptions for achieving outputs</p> <p>Cooperation of individuals and institutions in designing pest management program for small farmers of the tropical LDCs.</p> <p>Acceptance by LDC farmers of the concepts of pest management and their commitment to follow recommended practices.</p>

NS 22-40 2-6-69
 SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project _____
 From FY _____ to FY _____
 Total U.S. Funding _____
 Date Proposed _____

Development of Improved Varieties of Soybeans, Systems of Post Management and Post Harvest Operations
 Pooled Title & Under and Reduction of Social and Economic Constraints on Expanded Production and Use.

NARRATIVE SUMMARY	OBJECTIVELY MEASURABLE INDICATORS	MEANS OF VERIFICATION	ESSENTIAL ASSUMPTIONS
<p>Output</p> <p>7. Develop improved production, harvesting, handling and storage methods for seed and grain under tropical conditions.</p>	<p>Dependent on Outputs</p> <ol style="list-style-type: none"> 1. Identification of seed, soil and environmental factors that affect germination and emergence. 2. Determination of tillage and planting methods required for early plant growth in tropical soils. 3. Development of practical harvesting methods to obtain mature seed and high quality grain. 4. Determination of biological and physical factors that affect seed quality and storability. 5. Development of a system for tropical small farm storage of soybean seed. 6. Determine effects of varietal differences on soybean seed storability and storability of soybean funds. 	<ol style="list-style-type: none"> 1. Improvement of stands in soybean farmers fields. 2. Decline in damaged seed and low quality grain at local markets. 3. Higher percentage of soybean crop retained at farmstead. 4. Longer shelf life of soybean food products in homes and village stores. 	<p>Assumptions for achieving outputs:</p> <p>Irregular stands in farmers field due to poor germination or emergence can be improved through adaptive research.</p> <p>Quality of seed harvested and in storage, if monitored, will have positive effect on germination, emergence and eventual yield of following season crop.</p> <p>Storage system requiring low-tech technology can be satisfactorily developed within economic bounds of the LDC small farmer.</p>

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NSF 49-10-0-0-0
SUPPLEMENT 1

Development of

PROJECT DESIGN SUMMARY

LOGICAL FRAMEWORK

Project Title & Number

Improved Utilization of Soybean Systems of Pest Management and Post Harvest Operations and Reduction of Social and Economic Constraints to Expanded Production and Use.

Life of Project

From FY _____ to FY _____

Total U.S. Funding

Date Prepared

P. 28

NARRATIVE SUMMARY

Output

VI. Develop methodology for reducing the social and economic constraints to expanded soybean production and use in tropical LDCs.

QUANTITATIVELY VARIABLE INDICATORS

Magnitude of Output

1. Complement the research of biological and physical sciences in reducing the constraints to improved protein-calorie use in LDCs.
2. Determination of prospective food needs in selected countries, the role of soy foods in future diets and the economics of domestic production, imports and processing locations.
3. Determination of the comparative advantage of soybeans among competing crops, estimation of supply response to producer prices and assessment of the role of pricing policy under alternative conditions.
4. Assessment of the costs and benefits of alternative kinds and levels of soybean production technologies and social and economic constraints to yield and production increases.

MEANS OF VERIFICATION

1. Increased numbers of agricultural social scientists interacting with agricultural scientists in production and utilization problem solving research.
2. The degree to which "second generation" research needs are decreased in subprojects.
3. Availability of reliable economic data on a wide range of issues from which strategies for achieving project targets may be selected.

ESSENTIAL ASSUMPTIONS

Assumptions for achieving outputs

- That LDC small farmers will provide information on production costs and food habits.
- That research in social sciences will have direct benefits to agricultural development and soy food utilization programs.

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FD-302 (Rev. 12-13-60)
SUPPLEMENT 1

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Project Title & Number: **Development of Soybean Production and Post-Harvest Operations and Marketing of Soybean Products to Expand Production and Exports**

Life of Project
From FY _____ to FY _____
Total U.S. Funding _____
Date Prepared _____

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Inputs:</p> <ul style="list-style-type: none"> Professional research personnel Technical support personnel Graduate and research assistants Program management skills Support from institutions associated with the developing International Soybean Network Complementary inputs from associated INTSOY country projects and from anticipated General Technical Service Agreement. Facilities - land, buildings, equipment--and personnel of the University of Illinois 	<p>Implementation Target (Type and Quantity)</p> <p>See budget for magnitude of input by objective.</p>	<p>Contractor records.</p> <p>Audit by BCAA.</p> <p>Evaluation visits by AID Project Manager.</p>	<p>Assumptions for providing inputs:</p> <p>That most direct and indirect associated with this research contract will be provided for years by USAID.</p> <p>That complementary AID-sponsored activities, e.g., country task orders, technical assistance contracts, general technical service agreements, participant training agreements will be available as appropriate to support the objectives of the research con-</p>

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Appendix E

Time Phased Plan of Work

