

PN-AAL-162

9310560

AID / fa - C-1294

INTSOY Project Reports



International Soybean Program

INTSOY

College of Agriculture
University of Illinois at Urbana-Champaign
College of Agricultural Sciences
University of Puerto Rico, Mayagüez Campus

INTSOY Retreat V

February 14 and 15, 1982

Illini Union Building

University of Illinois at Urbana-Champaign

IPR-82-1

Planning Committee

L. H. Camacho
L. R. Hackler
B. J. Irwin
M. E. Irwin
E. D. Kellogg
J. W. Santas
J. A. Jackobs, Chair

CONTENTS

- I. Opening Session
- II. Progress Reports
 - Training and Outreach
 - Production
 - Protection
 - Utilization
- III. Activities
 - Follow-up on Peru Project
 - Zambia Project Start-up
 - International Soybean Center
 - ICA/CIAT/INTSOY Relationships
 - Puerto Rico - Illinois Relationship
- IV. Working Group Discussions
 - Conferences
 - Publications
 - Training
- V. Future Planning
 - Issues for Future In-Country Programs
- VI. INTSOY Retreat V Program
- VII. List of Attendants

I. OPENING SESSION

INTSOY Retreat V was opened with welcoming remarks by University of Illinois College of Agriculture Dean Orville G. Bentley and by University of Puerto Rico Director of International Programs Julio Lopez-kosa. INTSOY director Harold E. Kauffman spoke briefly to the participants and then turned the meeting over to the session chairman Robert W. Howell. The following summaries of INTSOY progress reports were presented by various staff members.

II. PROGRESS REPORTS

Training and Outreach - J. W. Santas

As stated in the INTSOY brochure, "Our outreach and educational work is characterized by cooperation with national programs and organizations in countries around the world."

Training

In 1981 when the processing course was cancelled because of insufficient enrollment, many thought it had lived its useful life. However, it looks better for 1982 and as of this date, a total of six people have enrolled for the course. Current enrollees are from Bangladesh, India, Hong Kong, Malaysia, Philippines, and Sri Lanka; with Korea, Mexico, Burma and Ethiopia as possible sources of additional participants. The course has provided significant outreach to a total of 72 people from 33 different countries in the six times it has been offered.

The 1981 production course had the smallest enrollment to date, with eight participants. Holding the 1982 course remains in doubt, since only eight people have been identified as prospective participants. If the enrollment and response to this course indicates that changes need to be made in scheduling and format, then INTSOY will depart from what has become a routine, but highly useful and effective, part of the total program. Over the seven years the course has been offered, INTSOY has developed very good working relationships with 89 people in 39 different countries. These courses also have helped INTSOY develop working relationships with many sponsoring organizations in addition to AID and FAO.

No overseas courses were presented in 1981. The most recent was given in Colombia in November and December of 1980 and was attended by 28 people from 10 different countries. It demonstrated that INTSOY can effectively combine resources with another organization to present effective training overseas. John Santas has resumed discussions with ICA and made contacts that should result in a third course being presented in November and December of 1982. Dialogue also has been continuing between INTSOY and IITA in Nigeria, which could eventually lead to presenting a 1983 course to serve a West African audience at their institution. By that time, they hope their soybean program will have matured sufficiently in order to show it to a wide range of country representatives. INTSOY staff members have established contacts in Thailand that might make it possible to offer a 1984 course in that country to serve an Asian audience.

A large percentage of the total number of international visitors who come to the University of Illinois appear on campus specifically because of INTSOY. In 1981, John Santas worked with a total of 204 visitors from 20 different countries who were here either to learn about INTSOY or confer with INTSOY staff. For comparison, in 1980 INTSOY had 117 visitors from 18 countries.

In early October, a questionnaire was sent to all 161 past participants in short courses and 31 responses have been received to date. 1982 course announcements were included in this mailing and have been publicized through other ways. INTSOY staff was asked to help in bringing the courses to the attention of potential participants.

INTSOY Newsletter and Mailing List:

There are currently 2,100 entries on the INTSOY mailing list, two-thirds of which are mailed overseas. The INTSOY Newsletter is received by soybean scientists in 132 countries, and INTSOY publications can be found in 200 libraries worldwide.

In 1981, the mailing procedure was changed. U.S. items are sent by bulk mail, and surface mail is used for overseas.

For the past two years, three editions of the Newsletter have been issued: English, French, and Spanish. A series of articles entitled "INTSOY Research Highlights" were begun in February 1980.

INTSOY Publications:

Numbers 2 through 19 are in circulation with three additional numbers in press. The demand is high for all series items. From April 1980 through November 1981, INTSOY received 730 requests for a total of 2,900 items.

Reports continue to be issued in three series: Staff Reports, Country Reports, and Project Reports.

After nearly a year in preparation, the INTSOY brochure came off the press in November 1981. 7,000 copies were printed and staff were encouraged to distribute them in their travel.

INTSOY activities were included as part of a display by the Office of International Agriculture at a tri-state Farm Progress Show held in September 1981, which was attended by more than a quarter of a million people.

SIRIC:

In reassessing the work done the past ten years, the Soybean Insect Research Information Center decided to concentrate on two main areas of work:

- 1) Accelerate search and acquisition of soybean entomology documents not yet in SIRIC's collection.
- 2) Update and improve computerized operations to incorporate recent developments in computer technology, thus making operations more efficient.

Major gaps have been detected in the literature of soybean producing countries, other than the United States. SIRIC is concentrating strictly on soybean (plus arthropod) literature, with the goal of enriching the collection with significant representations from South American, Japanese, Chinese, Indian, Korean, and Russian literature. A project was initiated in early 1979 with individual cooperators and institutions in the People's Republic of China for exchanging SIRIC services for publications on soybean entomology from that country.

The current hardware in use by the University of Illinois is a Cyber 175 and programs written prior to the change to this computer had to be adapted for the new machine. An on-line program for bibliographical input was developed and is in use.

In 1980-1981 SIRIC provided services to individuals in 48 countries, responding to over 1,500 requests. In its holdings are 19,300 fully processed documents in the computer. Among those still to be processed are many Russian, Chinese and Japanese papers, some of which have been translated for SIRIC.

Extending the services to a wider community of potential users has been a major concern. To help reach this goal, a leaflet describing the two soybean entomology information systems (SIRIC and IRCSA) was distributed at international meetings and sent with other SIRIC publications to many countries. Participation in International Entomological Congresses, though not funded by INTSOY, gave much needed visibility.

The Soybean Insect Research Information Center represents a unique commodity-oriented bibliographic data base in entomology and can offer support services to researchers in many ways. For proper performance it must be comprehensive and current. The collection is steadily growing and the gaps in earlier years of published literature are decreasing.

IRCSA:

The International Reference Collection of Soybean-Associated Arthropods (IRCSA) is a computer-based, commodity-oriented systematic collection of world scope. The purposes of the collection are four-fold:

1. To survey the soybean-associated arthropods of all soybean-producing areas of the world, placing major emphasis on the phytophagous species, their parasites and predators, and on vectors of soybean diseases;
2. To monitor the major pest species for possible changes in geographic distribution;
3. To aid in predicting insect problems in areas where soybean production is being initiated;
4. To provide identification services for soybean researchers and producers.

Initiated in 1970, IRCSA now incorporates some 175,000 specimens in some 2,600 taxa. The included material is curated in conventional museum modes and is

housed in about 300 National Museum drawers, two cabinets of alcohol vials, and one cabinet of microscope slides. The collection is physically housed in the Illinois Natural History Survey in Champaign. The curator, John K. Bouseman, is an employee of the Illinois Natural History Survey, and he has maintained the collection since 1976.

The material in IRCSA is identified partly in-house and partly by outside specialists. Some 130 cooperating specialists in domestic and foreign academic institutions and museums contribute identifications. Many taxonomic novelties are included in IRCSA, because much of the material is obtained by collecting efforts in remote areas that were previously difficult to reach.

Both research and service functions are included in IRCSA. In general, there are four areas in which IRCSA provides service:

1. Through the provision of authoritative determinations of soybean pests and their parasites and predators. Some 50 such requests have been received in the past 2-3 years;
2. Through the provision of information on the geographic distribution of pest species;
3. Through participation in the soybean production training course;
4. Through the preparation of manuals for the regional identification of soybean pests. Two such manuals are currently in preparation.

Production - C. N. Hittle

Thirteen soybean breeders from 10 countries contributed 30 new soybean cultivars for SIEVE-81, which was grown by cooperators in Ecuador, Colombia, Puerto Rico and Sri Lanka. Since the inception of SIEVE in 1978, 137 new cultivars have been evaluated and made available to international cooperators.

The SPOT-81 was composed of 21 cultivars, 13 of which were selected from SIEVE-80. Of the 21 cultivars, 16 proved to show promise and were advanced to ISVEX-81. SPOT-81 was conducted by 21 cooperators from 19 countries and 7 zones. For the ISVEX network INTSOY continues to send out tropical, subtropical and temperate trials. One hundred and fifty-five cooperators in 82 countries requested 183 ISVEX-81 trials. The breakdown by latitude groups was 96 tropical, 35 subtropical, and 52 temperate trials.

The entries for the 1982 ISVEX trials reflect the progress associated with cultivar improvement. Of the 16 entries in the tropical ISVEX, 10 are a result of INTSOY's cultivar development program and were generated in participation with international research cooperators. The wealth of information generated as a consequence of the ISVEX network is shared with over 270 institutions and individuals in developing countries. The latest published report on ISVEX results, for 1978, indicates the average yield of the four check varieties, over 37 tropical locations, was 1872 kg/ha. The variety Davis, which is consistently outstanding in ISVEX trials, yielded 2,297 kg/ha over the tropical locations.

During the year, more than 100 cooperators from more than 60 countries requested material other than normal ISVEX commissions. These requests were not only for soybean seed but included requests for information on crop management, cultivar characteristics, cost of production, marketing, processing and utilization of soybeans. In Puerto Rico, line selection, line testing and cultivar testing are conducted during the summer season. Seed increases and hybridizations are accomplished during the winter season.

Protection - W. H. Luckmann

Entomology Overview:

The interactions between INTSOY and the domestic programs in soybean entomology have proven mutually beneficial. The fundamental Integrated Pest Management (IPM) development and implementation models established domestically have been successfully adapted for international use. These models provide a phased program for the identification of major pests, evaluation of their damage potential, design of simple control strategies based on extant information on pest ecology, and expansion of the ecological data base along with concurrent improvement of the preliminary control strategies.

In the implementation of this phased program, some tangible landmarks that are shared with INTSOY have been reached in that the domestic program created and continued to support SIRIC and IRCSA. These data bases are fundamental research units that also support the training and outreach functions of INTSOY. Basic methodologies have been developed for sampling arthropod populations and assessing the damage potential as well as economic thresholds for some of the major soybean pests. Improvements of control tactics emphasized host plant resistance and biological control. Breeding lines with resistance to defoliators have been released and some have been tested in cooperation with the INTSOY breeder and agronomist in Puerto Rico. The biological control area is actively involved in the search for and cataloguing of natural enemies of major soybean pests. This search has been expanded into several countries in South America, as well as to Japan, Thailand, India and China. Free flow in information and exchange of biological control materials among interested country programs is expected to result from these efforts.

Integrated programs have been developed for, and the basic concepts are being adapted to, different areas. The adjustments needed for this adaptation are generally only to reset the crop phenology and the annual cycles of pests. Details of decision-making plans may vary from region to region, but the fundamental approaches are essentially the same for most world soybean growing regions. The application and validation of these plans under many diverse conditions lend considerable strength to and build confidence in the plans. These are only a few general aspects of the program that demonstrate some of the dimensions international involvement adds to the domestic programs, as well as the contributions of the latter to INTSOY's endeavors.

Entomology Research and Applications:

Entomology research emphasized three areas during 1981:

- 1) soybean mosaic virus (SMV) epidemiology and behavior of associated vectors;
- 2) Orius biology, behavior and accumulation of relevant literature; and
- 3) insect pest management system for soybean grown in the high jungle zones of Peru.

1. SMV is probably the most serious virus problem of soybean on a worldwide scale. The research towards managing it has involved a genuine team effort including virologist, breeder, and entomologist. This past year, the entomologists looked at ways of modifying cropping practices and the subsequent effect of these on timing and pattern of SMV spread, especially for seed increase fields. Altering planting dates was discussed as one of several parameters investigated. In effect, earlier planted soybean attracted fewer aphids than did later planted soybean; SMV spread was proportional to the timing and numbers of vector species landing in the fields. It appears ground cover may be the major factor responsible for altering landing behavior of vector species.

It is important to monitor aphid vector activity in soybean fields. To this end, a monitoring method has been developing and improving over the past six years. These monitoring devices are becoming widely used in the USA and abroad and are becoming the world standard for this type of work for all annual crops:

- Connecticut, Ohio, Michigan, Minnesota, Florida
- Adopted by S-127 Regional program on forage legume viruses
- Georgia, Louisiana, Mississippi, S. Carolina, Virginia, N. Carolina
- International - China, England, Ecuador, Peru

A former graduate student supported by INTSOY, Dr. Susan Halbert, visited Nanjing, China for eight months, sponsored by the National Academy of Science. Her work there was to help identify the actual field vectors of SMV and to assess the flight timing and abundance of aphid vectors throughout the season. Her research amply demonstrated that for the Nanjing area A. citricola, not A. glycines as was previously thought, was responsible for most of the virus movement. She is currently working on joint publications with Chinese scientists. Plans are to continue the research exchange initiated by Dr. Halbert.

2. Bugs of the genus Orius are very important predators of several kinds of pests in soybean and other crops around the world. It is hoped that enough can be learned about this group of predators to understand their impacts on pest species dynamics and eventually to be able to manipulate them to improve their timing and impact on selected pests. Ways of monitoring the pest are being studied along with flight activity under various cultural situations. Also being researched is how and where Orius insidiosus oviposits in a soybean field, and what is the potential rate of increase. A world-wide literature review (some 1,400 citations) should be ready for publication some time this spring.
3. The insect pest management program in Peru was initiated in 1979. It resulted in development of a plan of approach that should be applicable to any country.
 - a. Identification of probable pests and development of an initial technology package.
 - b. Research into pest and natural enemy population dynamics relative to crop phenology: Key pests actually differed among areas.
 - c. Feedback from farmers regarding what is not working in package (e.g. chemical recommendations) and research into these areas. Carbaryl was found less effective under local formulation.

- d. Revision of technology package based on new data.
- e. Development of tactics other than chemicals for lowering key pests.
- f. Expand insect pest management program for Peru by expanding area of coverage and crops under consideration.

Probable concerns of the entomology program in the future:

- a. Develop similar IPM programs for Asia and Africa.
- b. Develop Orius project, especially under tropical situations.
- c. Begin program on Polistes as a manageable predator in soybean ecosystems. A proposal is currently into Title XII for funding, in cooperation with CIAT.
- d. Continue pursuit of SMV management by managing vector timing and abundance.

Virology

The following significant contributions by the soybean virology research group were reported at this year's INTSOY retreat. Many of these accomplishments are the result of collaboration with INTSOY colleagues in other disciplines at UIUC or UPR and with colleagues in other institutions around the world. The focus of the program continues to be on major needs, current or projected, on which the group feels it can make significant progress.

1. A new major genetic system in soybeans for resistance to soybean mosaic virus (SMV) was described and this gene was combined with one previously reported into advanced tropically adapted lines.
2. A preliminary yield trial was conducted with some of the better SMV-resistant lines.
3. Several new sources of resistance to a broad range of SMV strains were identified.
4. Studies were continued on the nature of resistance in soybeans to transmission of viruses through seeds.
5. Virus-free seeds of over 400 tropical soybean germplasm accessions were produced and distributed to colleagues at IITA in Nigeria and ICA in Colombia for use in regional breeding programs.
6. An INTSOY SMV strain reference collection was developed in response to many requests for samples of our reference strains for classifying SMV.
7. Two major field experiments on virus-induced yield loss assessment were conducted.
8. A new ultrasensitive method for detecting whitefly-borne geminiviruses was developed and applied to detection of a soybean virus from the Caribbean. The availability of this method was announced to colleagues in various developing countries and samples sent from these countries are now being tested.
9. Work was begun to develop a method for inducing male sterility in soybeans that may be of use in doing quantitative genetic studies with soybeans.
10. Fundamental work expected to contribute to methods for genetic engineering of plants, including soybeans, is being carried out.

Utilization - A. J. Siedler

Utilization is commonly defined as consumption, since soybeans produced are destined to be consumed either directly or indirectly by man. Utilization has two primary functions: 1) to increase the food supply, 2) to improve nutrition.

The approach to establishing a utilization program encompasses seven major points:

1. Assess the problem--the physical needs regarding food and nutrition and the economic and anthropologic constraints;
2. Develop product concepts to answer the needs established;
3. Insure both the availability of raw materials in quantity and quality, as well as suitable technologies for processing and storage of product;
4. Develop products which have suitable acceptance, can be processed readily at low cost and contain good nutrition;
5. Develop markets for these products using appropriate strategies such as nutritional advantages, good taste, low price, etc.;
6. Evaluate the impact the introduction of the product had on food supply and nutritional advantages;
7. Evaluate the total utilization program and institute appropriate changes.

It should be pointed out that many of the activities necessary to develop a utilization program must be initiated simultaneously with production activities, in order to have utilization components in place at the time soybeans are made available for consumption.

There are six primary problems associated with soybean acceptance that must be overcome in utilization programs:

1. Prevention of off-flavor and off-color;
2. Elimination or neutralization of anti-nutritional factors;
3. Maximization of protein quality and trace element bioavailability;
4. Development of suitable functionalities of soybean products for use with or substitution of traditional foods;
5. Minimization of flatus in soy products;
6. Development of a competitive capability for soybean products in the areas of raw material availability and quality, processing, storage and distribution within the economic system.

Limited resources have been made available to support research directed toward soy utilization in developing countries. These resources (primarily via the USAID research contract) have been focused on soybean processing using simple

technology as well as studies of the cooking quality of selected soybean cultivars regarding texture and flavor.

There are a number of other research programs in the area of soybean utilization which have potential for use in developing countries. The following are examples of research projects currently underway:

1. Optimization of processing parameters for the manufacture of full-fat soy flour as a substitute for coconut milk;
2. Effects of immaturity and mold on soybean product quality;
3. Optimization of lipoygenase inactivation and protein solubility;
4. Rheological properties of soybean products;
5. Development of stable intermediate moisture soybean products which would not require refrigeration and canning;
6. Studies on the functionality of soy proteins with respect to the potential use of soybeans in various products;
7. Methionine fortification of soybean proteins and studies on the stability of added methionine during processing;
8. Within the area of nutrition, there are several projects involving the bioavailability of trace minerals in soy products. This is a significant area of research in both the Departments of Food Science and Foods and Nutrition. Mineral bioavailability is an important factor in certain diets, since the available trace minerals in cereal based diets are often marginal. Therefore, the effects on mineral content and bioavailability of the addition or substitution of soy products to indigenous diets must be assessed. In addition, a number of research programs involving sophisticated processing systems are underway.

There are other activities at UIUC which relate to soybean utilization. Among these are: answering numerous domestic and foreign inquiries; direct input into the INTSOY Outreach Programs (e.g., Sri Lanka and Peru); development and presentation of the INTSOY Utilization Short Course; participation in the INTSOY Production Short Course; hosting numerous international visitors with interest in soy utilization; development of an exchange program with Egypt regarding use of whole soybeans for home, village and commercial use and as meat extenders. A thesis on the selection of optimum size and location of a soybean processing plant in Puerto Rico has been completed by F. Medina-Lopez under the advisorship of Professor Earl Kellogg.

The utilization program has three major needs:

1. Further development of flexible technology for soy products;
2. Development of suitable assessment techniques to evaluate nutritional impacts;
3. Increased economic and anthropologic support.

III. ACTIVITIES

Carl N. Hittle gave a presentation to the luncheon guests on the Sri Lanka soybean project.

Thursday afternoon activities, chaired by T. A. McCowen, included reviews of several country projects as well as reports on INTSOY relationships.

Follow-up on Peru Project - Luis Camacho

The INTSOY Peru project began in February of 1978 and terminated in August 1981. Its components -- extension, crops and economics, food processing, breeding and agronomy, and entomology -- were designed to identify problems that were constraints to soybean production in Peru. The high jungle area where the project was conducted was unique because most of the farms in the region were small -- from $\frac{1}{2}$ to 20 hectares. Other problems included: the lack of farmer knowledge about soybean cultural practices; a cropping system based on shifting cultivation; a planting system which included little soil preparation, poor quality and insufficient supply of seed for planting; little use of machinery for planting and none for harvesting; lack of farm credit; poor marketing channels and the unavailability of a true extension service.

One of the first activities undertaken was to offer training courses to extension personnel in soybean production techniques. The extension agents then trained farmers, held field days, and visited the farmers in each region. Visits were made to the creditors in each region to inform them of the economics of soybean growing. Informational publications were generated for farmer use. Radio announcements prior to planting season were used to acquaint farmers with soybean growing. Research was conducted on weed control and soil problems. Ways of storing seed to maintain viability were studied, as well as testing of different varieties. Cost of production was the main economic concern in addition to labor utility and marketing problems. The food processing effort was centered in Lima, where soy milk and soy meal procedures were developed. Two training courses were conducted in Peru during the project -- one concerning rhizobium and the other for field technicians.

Dr. Camacho indicated that contacts with Peru must be maintained in order to support and expand soybean interest there. He suggested former team members should meet to decide how desirable aspects of the program can be continued.

Zambia Project Start-up - T. A. McCowen

Zambia Agricultural Research and Extension (ZAMARE) is not an INTSOY project, per se; however, past INTSOY work was instrumental in the contract being awarded to the University of Illinois. The 5-year project is a cooperative endeavor between UIUC, Southern Illinois University at Carbondale and the University of Maryland-Eastern Shore. Seven long-term technical advisors will assist the Zambian government in their endeavor to strengthen its agricultural

research capacity and increase the effectiveness of its extension service. The soybean aspect of the program calls for a soybean breeder to be part of an oilseeds commodity research team. Currently, soybeans are not widely grown in Zambia, but the country has good potential for both commercial production and small farm or village use.

International Soybean Center - W. N. Thompson

W. N. Thompson provided a brief history of the past efforts of the INTSOY program. INTSOY support has traditionally come from USAID funding, with an initial grant from the Rockefeller Foundation. The possibility of joining CGIAR has been explored. At one time, it was hoped that INTSOY would be funded under Title XII legislation and the Collaborative Research Support Program (CRSP). The possibility of working with other universities was also explored. The International Soybean Center is the latest effort to put expanded and more secure organizational funding under INTSOY.

INTSOY now is recognized as having the U.S. leadership role in international soybean work. Several years ago individual soybean producers requested that INTSOY work with them toward establishment of an International Soybean Research Institute. Much time was spent on developing the concept and there is still interest in it, but it is now appropriate for INTSOY to take the lead in this work. The best alternative must be decided upon in the next two or three months. Considerable attention must be given to an improved organizational form if INTSOY is to continue to develop.

ICA/CIAT/INTSOY Relationship - R. W. Howell

In November of 1980, Director-General of CIAT John L. Nickel wrote to W. N. Thompson regarding soybean research and collaboration between INTSOY, CIAT and ICA. A committee was formed to consider the situation. They visited CIAT and ICA during spring 1981, and specific recommendations were developed and sent to Dr. Nickel. In the fall, Douglas Laing of CIAT wrote asking that consideration of the agreement be postponed pending some organizational changes within their system. If INTSOY would resume developing the agreement, it could be reactivated, which would give INTSOY a presence in South America. A proposal would also need to be developed for funding the agreement.

Puerto Rico-Illinois Relationship - Julio Lopez-Rosa and W. N. Thompson

W. N. Thompson noted that the Puerto Rico-University of Illinois ties are INTSOY's most fundamental institutional relationship. It is a true partnership in terms of endeavoring to build an international dimension within each institution. The relationship has no working problems, but there are financial difficulties in that USAID funding for Puerto Rico has been curtailed, putting it under definite constraints. Puerto Rico has been the key to solving the problem of how INTSOY, in temperate Illinois, can conduct tropical soybean research.

Julio Lopez-Rosa noted that Puerto Rico offers many advantages to the soybean program and has maintained a fruitful relationship with UIUC over the years.

Puerto Rico is more interested than ever in continuing its association with INTSOY. The functions of teaching, research and extension are truly integrated at the Mayaguez campus and INTSOY is a basic component of the international program there.

IV. WORKING GROUP DISCUSSIONS

The January 15 morning session, chaired by L. R. Hackler, was devoted to three working group discussions. Reports resulting from these meetings follow.

Conferences Working Group Session - J. A. Jackobs, Chair

The following questions were considered by the committee during the meeting:

1. Should INTSOY attempt to co-sponsor an international conference each year?
2. Both regional and world-wide conferences have been held. Should INTSOY place greater emphasis on regional conferences in the future?
3. The early conferences tended to have general topics, but more recently they have been more specific--soybean rust, irrigation, and seed quality. Should INTSOY give preference to specific topics?

Regional workshops in plant breeding, plant pathology, entomology, mechanization, utilization, farm management and marketing, and irrigation can serve a real need not only in the dissemination of knowledge but also in providing an opportunity for specialists to become acquainted. Should INTSOY place more emphasis on workshops which attract specialists, than on conferences which tend to attract administrators?

The committee reviewed the number and types of conferences either initiated by INTSOY or in which INTSOY was a collaborator.

Conferences initiated by INTSOY:

1. Mayaguez, Puerto Rico, February 4-6, 1974. Proceedings of the Workshop on Soybeans for Tropical and Subtropical Conditions. Sponsored by INTSOY AND USAID.
2. Addis Ababa, Ethiopia, October 14-17, 1974. Soybean Production, Protection and Utilization. Proceedings of a Conference for Scientists of Africa, the Middle East, and South Asia. Edited by D. K. Whigham. Sponsored by INTSOY & Ethiopian Institute of Agricultural Research. Supported by USAID.
3. Chiang Mai, Thailand, February, 1976. Expanding the Use of Soybeans. Proceedings of a Conference for Asia and Oceania. Edited by Robert M. Goodman. Sponsored by INTSOY, the Government of Thailand, Asian Vegetable Research and Development Center. Supported by USAID.

4. Manila, The Philippines, February 28 - March 4, 1977. Rust of Soybean - The Problem and Research Needs. Report of a Workshop held in Manila, The Philippines. Edited by R. E. Ford and J. B. Sinclair. Sponsored by INTSOY, the Asian Vegetable Research and Development Center (AVRDC), and the Philippine Council for Agriculture and Resources Research (PCARR). Supported by USAID.
5. Cairo, Egypt, September 1-6, 1979. (In press). Irrigated Soybean Production in Arid and Semi-Arid Regions. Edited by W. H. Judy and J. A. Jackobs. Sponsored by INTSOY, FAO, USAID, Ministry of Agriculture, Egypt, and Menoufeia University.
6. Colombo, Sri Lanka, January 25-31, 1981. (About to go to press). Soybean Seed Quality and Stand Establishment. Edited by J. B. Sinclair and J. A. Jackobs. Sponsored by INTSOY, USAID, FAO and the Government of Sri Lanka.

INTSOY has been a collaborator in the World Soybean Research Conference I held at the University of Illinois at Urbana-Champaign and World Soybean Research Conference II held at the University of North Carolina, Raleigh. INTSOY has been asked to collaborate in the planning of World Soybean Research Conference III to be held at Iowa State University, Ames, in 1984.

The committee agreed that conferences are a very important part of the total INTSOY program.

Recommendations:

1. The INTSOY Director should establish an INTSOY Committee on Conferences, comprised of no more than three people, to establish policy on conferences and workshops, with the following responsibilities:
 - a. To have INTSOY take the lead in programming the time and location of future World Soybean Research Conferences.
 - b. To study and make recommendations for long-range (up to five years in the future) programming of the time, subject matter, and location of INTSOY conferences and workshops.
 - c. To make recommendations on representatives to other workshops and conferences in which INTSOY is not a collaborator.
 - d. Have an INTSOY secretariat at the World Soybean Research Conference III at Iowa State University.
 - e. Be prepared to respond to outside requests for conferences and workshops.

In the committee's planning, the objectives for each INTSOY conference and workshop should be established. It should consider how the conference affects the visibility of INTSOY, if the conference or workshop is problem-oriented and if it will bring people of similar interest together.

2. The second recommendation was to the Director of International Agriculture and the Director of INTSOY:
 - a. It is recommended that discussions be held with the Agriculture Publications Office on handling future INTSOY publications.

Consideration should be given to providing financial support for a full-time editor in the Agriculture Publications Office to work on all INTSOY publications.

Participants: J. K. Bouseman
J. A. Bravo
L. R. Hackler
A. G. Harms
J. A. Jackobs
T. A. McCowen
J. B. Sinclair (recorder)
W. N. Thompson

Publications Working Group Session - R. M. Goodman, Chair

After a wide-ranging discussion of current publication practices and ideas for future developments, participants in this working group developed the following recommendations which are given with a brief summary of the group's discussion. The last recommendation listed was not discussed by the group, but arose following the plenary session in which all the working groups reported their accomplishments.

1. There was general agreement that the present INTSOY publications each serve useful functions and so we recommend the existing publication series be continued.
2. There was general agreement that, while the ad hoc system used in the past to develop and produce publications has been adequate, in the future it would be useful to have a committee which could guide the continued development of the existing publication series as well as assist in the development of new ventures. Some of the possible duties of this committee would be to:
 - a. discuss and propose publication policies for INTSOY
 - b. supervise the various INTSOY publication series
 - c. evaluate and make recommendations on new proposals from staff for future publications and
 - d. develop new publication ideas. The committee might assist the director in defining anew the purposes of the various types of publications. It might also consider suggestions from this working group, such as better use of word processing capability for information storage and retrieval, consideration of the use of existing publications by other organizations that might serve INTSOY's needs, and consideration of INTSOY's need for a publications officer.
3. The working group felt strongly that there is a need for a new series of publications to serve as how-to, or outreach, bulletins dealing with the many aspects of soybean production, protection, nutrition, utilization, etc.
4. There was general agreement that INTSOY should consider developing a series devoted to economic and planning policy issues. These publications would be targeted towards decision-makers in developing countries who deal with agricultural, marketing or overall economic planning.

Such documents would be useful in providing data and ideas relating to the role soybeans could play in planning. These documents also could be of use to INTSOY teams invited on consultancies to various countries.

5. There was a suggestion and general concurrence that INTSOY is now in a position to publish a world directory of soybean personnel, based on but not necessarily limited to, our mailing list.
6. INTSOY should consider publishing an annual report of its accomplishments as most of the CGIAR centers do.

Participants: R. L. Bernard
J. W. Erdman
D. R. Erickson
R. M. Goodman
B. J. Irwin
S. H. Johnson
J. Kogan
C. M. Pribble
S. A. Ryan
W. C. Stearn

Training Working Group Session - M. E. Irwin, Chair

Objectives

To date, the project has concentrated on developing leadership for country programs. A new objective should be to build national capacity in soybean production and utilization.

Degree training

The difficulty in getting foreign students admitted to the University of Illinois is an area that must be addressed. INTSOY's location within the Universities of Illinois and Puerto Rico gives us an edge over International Agriculture Research Institutes and we should take advantage of university degree training. Puerto Rico's degree training can be used for Spanish speaking scientists. We should stress more degree training on campus.

Non-degree training

Currently, short courses are offered at UIUC in production and utilization, with enrollment open to anyone. Improved funding is needed in order to be able to screen candidates for short courses. Perhaps different disciplines in different years could be emphasized. We need to consider the range of areas for training input and focus on those that will build national capacity (probably national leader and national research teams).

Regional and national training

Currently, this program is conducted only in Colombia. This type of training is perhaps more relevant and more economical than others because it could produce a more cohesive group in terms of needs and language. The training

can penetrate more thoroughly the national research team core, since more participants will be able to attend. Regional training efforts seem to be easier to fund--FAO, OAS and IICA fund such training in Latin America, for instance.

Perhaps we could cooperate with international agriculture research centers by helping them with degree training and in turn receiving from them assistance with regional training.

Recommendations

Develop a mechanism for implementing and evaluating a training policy and strategy within INTSOY. The mechanism should be on-going and should take advantage of the considerable expertise available. Such a mechanism should be sensitive to other international groups on campus, such as International Program for Agricultural Knowledge Systems (INTERPAKS), Program for Agricultural Communications Education Overseas (PACEO), and others, as well as to the INTSOY program at Puerto Rico.

Reporting session

A suggestion was made to publish a training manual for the short course held at UIUC. It would give participants something to read in preparation for class as well as take with them after the course. It would also help staff members prepare for teaching.

Participants: Luis H. Camacho
Suzi Halbert
Carl N. Hittle
M. E. Irwin
Gail Kampmeier
Harold Kauffman
Earl Kellogg
Julio Lopez-Rosa
Jane Polston
John Santas
L. S. Wei

V. FUTURE PLANNING

The January 15 afternoon session, chaired by R. E. Ford, included an address by W. N. Thompson on the current status of the AID research contract and implications for INTSOY.

Issues for Future In-Country Programs - Carl N. Hittle

Before discussing in-country programs of the future, it is appropriate to briefly review the in-country programs discussion held at the last INTSOY Retreat, November 5-7, 1980. At that time, the Symposium on Program Component for In-Country Activities reviewed project activities by INTSOY in other countries.

These activities were defined to include (1) resident advisors, (2) staff to identify problems and develop projects, (3) short-term consultants on soybean production and utilization, (4) cooperative research projects with scientists in developing countries, and (5) workshops. The classification of these in-country and regional activities is included in Appendix I. I have attempted to indicate examples of INTSOY activities under the various categories. It is appropriate to refer to this classification in order to assess past accomplishments and plan future activities.

The present discussion will not be restricted to *in-country* programs but will also consider *regional* and *other outreach* activities.

When one considers that INTSOY has had a very small number of professionals, since its inception in 1973, it is commendable that so much regional and in-country activity has taken place. For example, the workshops, which have been not only general and specialized but also regional and international, have made considerable impact. One frequently receives favorable comments as to their value. The proceedings of each workshop are especially useful to soybean research and extension personnel throughout the world. The people who work diligently to plan and implement these workshops and to publish the proceedings deserve a special vote of appreciation.

Following are some of the many factors which must be taken into consideration for outreach activities:

INTSOY Staffing: Resource Base vs. Outreach Staffing

The December 23, 1980 minutes of the meeting of the Committee for the Establishment of an International Soybean Center indicate, "There would be some rotating of staff between U.S. and foreign assignments, but emphasis would be on long-term assignments abroad in order to achieve maximum stability in each program and to foster rapport with the cooperating country."

The following quotations are from the June, 1973 Proposal for the International Soybean Resource Base prepared by the University of Illinois College of Agriculture.

- (a) "Special linkage relay station operations are planned in conjunction with cooperating international crop research centers such as IITA, CIAT, IRRI, ICRISAT and CIMMYT". page 6.
- (b) "One or more outreach teams are expected to be of service during the first base operating year. This number may rise to five or more, depending on requests received and support available." Page 71.

In order to be a truly international agricultural organization, INTSOY must find some mechanism of getting more people in the field--into national and regional programs or as liaison scientists. Ideally, INTSOY should have equal long-term FTE's in the field and at the universities. The field personnel should have the same degree of capability and professional excellence as the university personnel. This is expensive, but national and regional problems can't be solved if we don't know what the problems are. We are not likely to have this information unless we have resident staff in the problem areas.

National vs. Regional Approach

Ideally, INTSOY should be able to provide both national and regional assistance. However, with limited resources and personnel, such an approach may not be possible.

With the current situation in the regions and at the resource base, regionalization would seem logical. Several countries--for example, Indonesia, Thailand, India, Nepal, Sri Lanka, the Philippines and Burma--already have national soybean programs, even though they may be small. An INTSOY regional office--somewhere in Asia--would be able to assist these programs more effectively, more promptly, and more economically than the resource base offices at the University of Illinois. Similarly, several countries in Africa and Latin America already have soybean programs and perhaps the possibility of an INTSOY regional office in each of these areas should be pursued more vigorously. The advantages of a tie-in between the INTSOY regional office and one of the international centers, i.e., IITA in Africa and CIAT in Latin America, are obvious.

If individual countries need extensive assistance with their national soybean programs and if sponsorship (funding) is likely to be available, INTSOY could respond very effectively and promptly to the country request. The response would probably come from the resource base with assistance from the regional office.

International centers, such as IITA, CIAT, IRRI, ICRISAT, ICARDA and CIMMYT, and international organizations such as UNDP, FAO, IADS, IDRC, CIDA, USAID, CARE and UNICEF, have all had rather extensive experience with outreach activities. INTSOY has had strong linkages and, in some cases, memoranda of understanding with these organizations and can draw on their advice and experience. Stronger linkages, cooperative outreach efforts and closer associations are expected to develop between INTSOY and the international centers and organizations.

Systems Oriented vs Multiple Commodity Emphasis vs Soybean Emphasis

Future programs and projects (national or regional) in which INTSOY may be involved are more likely to be systems or multiple commodity oriented rather than just soybean-oriented. Broad-based programs such as an oilseeds project, a food-legume project, a farming systems program or an integrated cereals program are more likely to be developed instead of specific soybean projects such as the INTSOY Peru and Sri Lanka programs.

Managerial Skills vs. Technology Transfer

In many of the developing countries there is a great need for improved managerial skills and organizational abilities. Frequently, our overseas programs not only provide sound technical assistance but also make major contributions by demonstrating and implementing improved management and organization for the project. As the developing countries gain additional experience in management, they naturally become more independent and can command more autonomy in the operation of projects, which are assisted by bilateral and multilateral agreements. Our primary objective in developing countries should be to help people help themselves and to work ourselves out of a job.

As local personnel assume more responsibilities, the role of the expatriate adviser changes. In order to keep up with these changes, the adviser should be very sensitive and perceptive to the needs of the country, maintain a low profile and keep lines of communication open at all times. With the changing situation, there are likely to be more requests for short-term advisers and less need for long-term resident advisers, which could place additional demands on the adviser. Less time and fewer exposures will be available for thoroughly investigating country problems and for making realistic recommendations.

Training

During this retreat, the INTSOY training activities have been considered in some detail.

- a. **Short Courses:** The soybean production and processing short courses have been of great benefit to personnel from many countries and probably should be offered as long as there is sufficient enrollment. During the past seven years, the Sri Lanka Soybean Development Program has had a total of 14 participants in the soybean production course and six participants in the processing course. This training has materially advanced the country program and Sri Lanka speaks highly of these two short courses.

However, it appears the time has come for INTSOY to move more rapidly to regional training. Obviously, regional training in Latin America has been well received and will be continued and expanded. Additional regional or country training courses should be implemented as rapidly as possible.

There are many advantages to regional training including the following:

- (1) Courses can be taught in the language of the region.
 - (2) Subject matter offered regionally would be more relevant to situations that exist in countries within the region.
 - (3) Regional courses should be more economical. Presently, to send a participant from Sri Lanka to the processing and production courses at the University of Illinois costs approximately \$5,300 and \$8,300 respectively; including international travel.
- b. **Degree Training:** Graduate applications from many of the developing countries very frequently are difficult to evaluate. Those of us involved in country programs need to become familiar with undergraduate training in a specific country in order that we may be of maximum benefit to those who are evaluating the applications.
 - c. **Visiting Scholars from the People's Republic of China:** The People's Republic of China is anxious to send participants to the United States for training. Many participants are already in training and many more can be expected within the next few years. University of Illinois and INTSOY are likely to be involved in more individuals desiring various types of soybean research and extension training. It appears that, at least for the next few years, most of these participants will not be seeking degree training. However, some structuring of their training programs will be needed. Mechanisms must be developed which will allow the participants to receive the best training possible in the limited time they have in the United States. Mechanisms also need to be developed to insure that the advisers for these participants do not have to spend an inordinant amount of time with the housekeeping details for the participant.

Soybean Processing and Utilization

The problem of strengthening the processing and utilization component of INTSOY seems to be the most difficult to solve because of many factors, some of which were mentioned by Dr. A. J. Siedler in his discussion at this retreat. These factors include (a) lack of food scientists (counterparts) in the developing countries, (b) the difficulty of changing food habits, (c) the difficulty of recognizing the special properties of the soybean, (d) the lack of quality control in processing, packaging and storing soybean products, (e) the fact that food scientists cannot agree among themselves as to the priority of the food products made from soybeans and (f) the fact that resource base funding for processing, utilization and nutrition is likely to be from a different agency, or different branch of the same agency, than funding for soybean production and protection activities.

In many developing and tropical countries, the soybean production potential has now been adequately demonstrated and is no longer a constraint. The bottleneck for the development of a soybean industry in these countries is the processing of soybean products that will be accepted by the local population as well as local promotion, marketing and distribution system problems.

Previous speakers at this retreat have emphasized that INTSOY will need to continue to rely upon assistance from the food industry, as well as assistance from food scientists of the Universities and other public funded research organizations. The food industry in the U.S. and other countries is a large industry with highly qualified food scientists and processing engineers. They are always very cooperative and generous in assisting INTSOY.

It cannot be over-emphasized that INTSOY must give high priority to soybean processing and utilization in order to greatly expand the use of soybeans for human food and improve human nutrition around the world through the use of soybeans.

Closing

The retreat was closed with remarks by Director Kauffman on INTSOY direction for the 1980s.

Appendix I

IN-COUNTRY PROGRAMS ^{1/}

1. Resident advisors---Peru and Sri Lanka.
2. Staff to identify problems and develop projects.
 - A. BOA---Basic Ordering Agreement.
 1. Country/USAID/INTSOY.
 2. Guyana, Uruguay, Thailand, Peru, Ecuador, etc.
 - B. UNDP/FAO---Sri Lanka, People's Republic of China.
 - C. Direct agreement between country and INTSOY.
 1. Ivory Coast, etc.
 - D. USAID---Egypt, Zambia.
3. Short-term consultants on soybean production, marketing and utilization.
 - A. Thailand, Guyana, Peru, Sri Lanka, Pakistan.
4. Cooperative research projects with scientists in developing countries.
 - A. Thailand, Colombia.
 - B. IITA, EMBRAPA, etc.
5. Workshops
 - A. General---Puerto Rico (1974); Ethiopia (1974); Thailand (1976).
 - B. Specialized---Rust - Philippines (1977); Irrigation - Egypt (1979); Seed Quality - Sri Lanka (1981).

1/

As indicated in the Proceedings of the INTSOY Retreat IV, November 5-7, 1980.

INTSOY RETREAT

Thursday, January 14, 1982

275 Illini Union

8:10 a.m. Welcome--Dean O. G. Bentley and Dean Alejandro Ayala
8:20 H. E. Kauffman

Progress Reports--R. W. Howell, Chair

8:30 Training and Outreach--J. W. Santas
9:00 Production--C. N. Hittle
10:00 Break
10:30 Protection--W. H. Luckmann
11:30 Utilization and Economics--A. J. Siedler
12:00 noon Luncheon--314b Illini Union
John Yohe, speaker

T. A. McCowen, Chair

1:30 p.m. Follow-up on Peru project--Luis Camacho
Follow-up on Sri Lanka project--C. N. Hittle
Zambia project start-up--T. A. McCowen
International Soybean Institute--W. N. Thompson
ICA/CIAT/INTSOY relationship--R. W. Howell
Puerto Rico-Illinois relationship--Julio Lopez-Rosa and
W. N. Thompson

Friday, January 15, 1982

269 Illini Union

L. R. Hackler, Chair

8:30 a.m. Orientation for working groups
8:45 Working group sessions

Conferences--J. A. Jackobs, 263 Illini Union
Publications--R. M. Goodman, 267 Illini Union
Training--M. E. Irwin, 269 Illini Union

10:15 Break
10:45 Reassemble for working group reports and discussion
12:00 noon Break

R. E. Ford, Chair

1:30 p.m. Current status of AID research contract and implications
for INTSOY--W. N. Thompson
2:00 Issues for future in-country programs--C. N. Hittle
2:45 Break
3:15 INTSOY direction for the 80s--H. E. Kauffman
4:00 Adjourn

INTSOY Retreat Attendants - January 14, 1982

Orville G. Bentley
John Bouseman
Jose Bravo
George Brinegar
Luis H. Camacho
Jean Due
John Erdman
Danny Erickson
Upton Garrigus
R. M. Goodman
Ross Hackler
Susan E. Halbert
Alfred G. Harms
Carl N. Hittle
R. W. Howell
Bonnie Irwin
Michael E. Irwin
J. A. Jackobs
Sam H. Johnson
Ben A. Jones, Jr.
Gail Kampmeier
H. E. Kauffman
Earl D. Kellogg
Jenny Kogan
Marcos Kogan
Julio H. Lopez-Rosa
W. H. Luckmann
T. A. McCowen

Jane Polston
Carolyn Pribble
R. J. Reber
John Santas
Wes Seitz
A. J. Siedler
James Sinclair
W. Chris Stearn
Poorna N. Thapliyal
W. N. Thompson
Marlowe Thorne
L. S. Wei
Ray Woodis

INTSOY Retreat Attendants - January 15, 1982

J. H. Behrens
John Bouseman
Jose Bravo
Luis Camacho
John Erdman
Danny Erickson
Bob Goodman
L. R. Hackler
Susan E. Halbert
Al Harms
Carl Hittle
Bonnie Irwin
M. E. Irwin
J. A. Jackobs
Sam Johnson
Gail Kampmeier
H. E. Kauffman

Earl Kellogg
Jenny Kogan
Julio Lopez-Rosa
Tom McCowen
Jane Polston
Carolyn Pribble
John Santas
A. J. Siedler
Jim Sinclair
Chris Stearn
W. N. Thompson
L. S. Wei