

INTSOY

Summary of Progress 1973-1984



**College of Agriculture
University of Illinois at Urbana-Champaign**

SUMMARY OF PROGRESS
1973-1984

International Soybean Program (INTSOY)
College of Agriculture
University of Illinois
113 Mumford Hall
1301 West Gregory Drive
Urbana, Illinois 61801 U.S.A.

Telephone (217) 333-6422
Telex: 206957 INTAG URBA
Cable: INTSOY

CONTENTS

Introduction and Background	1
Research Support and Accomplishments.	1
Country Programs.	3
International, Regional, and Specialized Soybean Conferences.	4
Publications and Information Services	5
Training and Education.	6
The Changing Role of INTSOY	7
 Appendices	
I. Summary Information About International Soybean Trials.	9
II. International Soybean Variety Experiment (ISVEX) by Region.	10
III. Countries Cooperating in ISVEX.	11
IV. Countries Which Have Released ISVEX Cultivars for Commercial Production	15
V. AID Mission Supported Country Programs Under the AID Basic Ordering Agreement - Task Order Format	16
VI. INTSOY Publication Series	17
VII. Formal and Informal Relations with National and International Organizations	19

Introduction and Background

This document summarizes activities of INTSOY, the International Soybean Program, from 1973-1984.

In 1965, supported by the United States Agency for International Development (USAID), the University of Illinois at Urbana-Champaign (UIUC) initiated a project on soybean research in India as a part of the Agricultural University Development Program. This work demonstrated the potential for soybean production and use as human food in areas where the crop was not commonly grown. USAID and Rockefeller Foundation support from July 1971 to March 1973 permitted expansion of these activities to other countries. In 1973, the University of Illinois at Urbana-Champaign and the University of Puerto Rico, Mayaguez Campus, formally established the International Soybean Program.

INTSOY expanded its regional soybean collaboration in 1983 when, after ten productive years, the partnership between UIUC and the University of Puerto Rico, Mayaguez Campus, ended. The INTSOY plant breeder was transferred to Colombia to work on soybean improvement programs with the Instituto Colombiano Agropecuario (ICA) the Centro Internacional de Agricultural Tropica (CIAT), and with other Latin American and Caribbean Basin scientists. The INTSOY microbiologist transferred to the Asian Vegetable Research and Development Center (AVRDC) in Taiwan to work closely with scientists in Asia. We have also strengthened our ties with the International Institute of Tropical Agriculture (IITA) in Nigeria to accelerate soybean research activities in Africa.

The purpose of INTSOY is to improve nutrition in developing countries through the production and consumption of soybeans, a legume rich in calories, protein, and oil. Activities are directed towards countries in the tropics and subtropics which, in the past, have not shared in the benefits from soybeans. INTSOY cooperates with many national, regional, and international organizations to develop a strong global research, education, and service network.

Research Support and Accomplishments

Since INTSOY's creation in April 1973, the United States Agency for International Development has provided the core funding. Grants were made to both the University of Puerto Rico and the University of Illinois to strengthen the international soybean research and education capabilities. A Rockefeller Foundation grant supported some tropical soybean production research, and special grants from USAID, FAO, UNDP, UNICEF, CARE, and IBPGR have supported a range of special projects.

Program support is used for basic and applied research on constraints to production of soybeans in tropical and subtropical environments and to improve the acceptability of soybeans as a component of diets of low-income people. Results of research are reported in annual reports, scientific journals, and the INTSOY publications series. More than 400 research articles have been published in scientific journals and the INTSOY series has now reached 26 publications.

INTSOY's activities in germplasm evaluation and improvement, plant protection, and microbiology are directed toward identifying appropriate

technology and improving soybean production in various cropping systems.

INTSOY's cultivar testing program includes two interrelated trials: the International Soybean Observation Trial (ISOT) and the International Soybean Variety Evaluation Experiment (ISVEX). ISVEX trials have been conducted in 131 countries since 1973. The ISOT (formerly the Modified Initial Evaluation Variety Experiment (M-SIEVE) was initiated in 1984 to distribute a wider range of soybean germplasm. Annually approximately 200 scientists, representing some 100 research institutions and organizations from 60 countries, participate in this testing collaborative effort. These worldwide trials and the modest tropical breeding program in Puerto Rico and more recently in Colombia complement regional and national efforts in breeding and testing. The trials have stimulated breeding programs in a number of countries and have led to commercial production of trial entries in more than 20 countries. Currently more than half of the test entries are contributed by national programs, the remaining entries originate from the USA. Individual trial results are analyzed by INTSOY and returned to cooperators, and combined analyses and results from all locations are published by INTSOY (Appendices I, II, and III).

Number of Countries Conducting ISVEX Trials							
	Africa	Asia	Americas	Europe	Middle East	Oceania	Total
1973-1982	45	19	36	13	11	7	131
In 1983	27	11	23	6	6	1	74

In addition to supplying elite germplasm, ISVEX results give many leads on soybean breeding strategies for tropical and subtropical environments. The following general observations have been made from international trial results during the past decade.

- Yields are comparable in tropical and temperate regions.
- In the tropics, yields tend to be larger from later maturing cultivars than from early maturing varieties.
- Yields are affected more by changes in altitude than by changes in latitude.
- Yields are usually good when soybeans are first introduced into a region, but crops frequently face increased disease and pest problems when grown widely.
- Seed viability is a universal problem, but small seeded cultivars have better seed viability than large seeded cultivars.
- Small seed size does not appear to restrict yield potential.
- The protein content, oil content, and chemical composition of a cultivar remain stable in different sites and environments.

The trial results indicate that soybean cultivars can perform well in many environments when grown on experimental stations. However, to obtain large stable yields in a multitude of cropping systems and environments a vastly increased range of soybean cultivars are needed. India, Sri Lanka, Peru, Egypt, Turkey, Ecuador, Costa Rica, Nepal, and Guatemala are now some of more than 20 countries commercially growing soybean cultivars that were introduced through the INTSOY trials (Appendix IV).

INTSOY entomologists, pathologists, and weed scientists work

collaboratively with scientists in a number of tropical countries on component technology. Insect and disease problems on soybean have been minimized in several countries as a result of collaborative research and development activities. Virologists identified new strains of soybean mosaic virus (SMV) and in collaboration with the entomologists developed new methods to study virus epidemiology and control. Recently, a model has been developed that predicts yield and seed quality impacts of SMV. The seed pathologist has illustrated the role of some fungi and bacteria in reduced seed quality, developed innovative controls for seedborne pathogens and has studied the epidemiology of several seedborne fungal pathogens.

INTSOY microbiologists have conducted research on the distribution and survival of Rhizobium in different types of soils and studies on the enhancement of nodulation. These are essential for establishing productive soybean cropping systems, especially in the tropics where soybeans are frequently grown under less than ideal conditions. INTSOY is working collaboratively with the International Institute of Tropical Agriculture (IITA) in Nigeria to better understand the role that cultivars that use indigenous strains of Rhizobium can play.

INTSOY food scientists have developed a number of prototype technologies and acquired much experience in transferring them to developing countries. Among the techniques developed are methods for home preparation of soy milk, weaning or breakfast foods and other foods that combine with meat, vegetables, or fruit. The technique eliminates unacceptable flavors and anti-nutritional factors and shortens the cooking time. Because soy products are quite bland, they can easily be flavored to suit local preferences.

Country Programs

The University of Illinois has received funding from a range of donors to support in-country soybean research and development programs. Long-term programs have been conducted in:

India - Working collaboratively with Indian scientists, UIUC faculty introduced a wide range of soybean germplasm into India in the late 1960's and early 1970's. Strong soybean research programs were developed in the states of Madhya Pradesh and Uttar Pradesh and linked to other states through a national program. Soybean production increased from a few thousand hectares in the early 1970's to approximately 1 million hectares in 1983. Production increases occurred most rapidly in the late 70's and early 80's as cooperative organizations extended production technology to farmers and as marketing and processing organizations improved.

In late 1983 the Indian Government approved the establishment of a National Soybean Research Center to be located in Madhya Pradesh, the center of the soybean growing area.

Sri Lanka - Soybean development in Sri Lanka had multiple donor support: UNDP/FAO focused on production and UNICEF/CARE focused on the establishment of a food research center and a training program on soybean food consumer education. UNDP/FAO support commenced April 1, 1975, and the UNICEF/CARE portion began in mid-1977. INTSOY staff were

in residence until June 1981, when responsibility for the program was assumed by the Sri Lankan staff and one UNDP food scientist. There was no commercial soybean production prior to the 1970's. By 1983, soybean production had expanded to more than 15,000 hectares. Soybeans grown in Sri Lanka are processed and consumed locally in a variety of popular soyfoods. A dynamic training and extension program has promoted the consumption of soyfoods. In 1983, a four-tons-per-day dried soya milk factory opened and plans are underway to expand production of other soy foods. Sri Lanka serves as an excellent model of joint government and private industry development of a balanced soybean production and utilization program.

Peru - USAID provided funds to assist the Government of Peru to expand the cultivation of soybeans in the high jungle areas and to increased consumption of soyfood products. The project began in November 1977 and continued through August 1981. During that time production increased from a few hectares to approximately 15,000 hectares. Soy products were introduced into locally accepted foods including a beverage in both liquid and powdered form, soy-fortified bread, and soy-fortified noodles. An insect pest management program was initiated that has resulted in a national crop protection plan to be implemented in January 1985.

Short-term missions supported by the following donors were undertaken by INTSOY staff.

USAID mission supported country programs under the AID Basic Ordering Agreement - Task Order format. A number of missions were undertaken to evaluate various country needs in development of soybean industries (Appendix V). Six of these were in Latin America, five were in Africa, and two in Asia.

FAO has supported project identification missions in Iraq (1977), China (1981) and Vietnam (1982).

The Organization of the American States (OAS) supported a one-month consultancy on soybeans and other oilseeds in Haiti in November 1979.

The following countries have given their own support for INTSOY consultants to advise them on the possibilities of establishing soybean programs.

Saudi-Arabia--two-person team to study soybean potential.

Ivory Coast--support for degree training at the University of Illinois and for University of Illinois and Mississippi State University personnel to advise on soybean development in Ivory Coast.

Venezuela--support for soybean breeder to assess current activities and recommend directions for future research.

International, Regional, and Specialized Soybean Conferences

INTSOY sponsored conferences and workshops have been a forum for exchanging ideas and information. They have stimulated interest in the use of soybeans. The proceedings from the following conferences are among the most

popular in the INTSOY Publication Series.

International: The University of Illinois at Urbana-Champaign organized and hosted the First World Soybean Research Conference, August 3 to 8, 1975 jointly with the Illinois Natural History Survey, USDA, USAID, and National Soybean Crop Improvement Council. Six hundred thirty-five scientists from 49 countries participated.

Regional: AID has supported the following three regional soybean conferences:

- For the Caribbean, Central and South America at Mayaguez, Puerto Rico, February 4 to 6, 1974, 71 participants from 12 countries.
- For Africa, the Middle East, and South Asia at Addis Ababa, Ethiopia, October 14 to 17, 1974, 97 participants from 27 countries.
- For Asia and Oceania, at Chiang Mai, Thailand, February 23-27, 1976, (with AVRDC and Government of Thailand joint sponsors), 225 participants from 21 countries.

Specialized conferences and workshops:

- A workshop on soybean rust was sponsored by INTSOY, the Asian Vegetable Research and Development Center (AVRDC), and the Philippine Council for Agriculture and Resources Research Development (PCARRD) in Manila, Philippines, February 28 to March 4, 1977. The report of this workshop serves as a statement of the problems and contains an outline of research needs for combatting this serious disease problem.
- A conference on irrigated soybean production in arid and semi-arid regions was held in Cairo, Egypt, September 1 to 6, 1979. Co-sponsored with the Ministry of Agriculture, Arab Republic of Egypt, and Menoufia University in collaboration with FAO and USAID, the conference participants reviewed the latest research results on production of soybeans under furrow and flood irrigation, identified constraints to improved production, and proposed needed research to address those constraints. Forty-five participants represented 12 countries and organizations.
- A conference on the problems of soybean seed quality and stand establishment was held in Colombo, Sri Lanka, January 25 to 30, 1981, co-sponsored with the Sri Lanka Ministry of Agricultural Development and Research and the Seed Technology Laboratory, Mississippi State University, in collaboration with FAO and USAID. Seventy-four participants represented 22 countries and four international organizations.

Publications and Information Services

- **INTSOY Publication Series**

The INTSOY Publications Series was established to communicate information to an international audience and to supplement articles published in scientific journals and bulletins. Twenty-six publications in the INTSOY Series have been released (Appendix VI).

- **The INTSOY Newsletter**

The INTSOY Newsletter contains information on current INTSOY

activities and research, and features news items of interest to soybean workers around the world. It was first issued in 1974 to approximately 500 individuals and organizations. Requests for the newsletter result in a current mailing list of nearly 2,200. The newsletter is now issued semi-annually in English, French, and Spanish

- **Soybean Insect Research Information Center (SIRIC)**
SIRIC maintains a computerized file on the scientific literature of soybean arthropods and supplies bibliographic listings and copies of documents. SIRIC responds to more than 500 requests per year and continually increases the number of references in the collection.

Training and Education

INTSOY has been involved in several types of degree and non-degree training programs:

- **UIUC Short Courses**

Two non-degree training courses were initiated in 1975 and are held at the UIUC in cooperation with the International Training Division of USDA/OICD. Course titles are:

- "Soybean Processing for Food Uses," a seven-week course which has been attended by 79 trainees from 36 countries.
- "Technical and Economic Aspects of Soybean Production," a twelve-week course that has attracted 101 participants from 42 countries.

- **Regional Training Programs**

The first off-campus INTSOY training courses on soybean production and use were held in Ecuador in late 1976 and in Peru in early 1977. Later a specialized course in soybean production for 15 Peruvian soybean extension workers was conducted November 26 to December 14, 1979, in cooperation with ICA at Palimira, Colombia. The second and third courses in Colombia were held in 1980 and 1982 and were attended by a total of 42 soybean scientists from throughout Latin America and the Caribbean. INTSOY also participated in a soybean production training program in Antalya, Turkey in 1984 for selected Turkish Extension Advisors and research scientists.

INTSOY, IITA, and the American Soybean Association (ASA) cooperated to conduct a workshop on soybean utilization at IITA headquarters in Ibadan, Nigeria in December 1983. This event attracted more than 50 West African participants. A similar workshop will be held in Sri Lanka in January 1985 and will be open to Asian scientists. In this case, INTSOY is cooperating with the Soybean Project of the Sri Lanka Department of Agriculture.

- **Degree-level Programs**

INTSOY can serve as a clearinghouse for planning and administering degree-level study programs. Our staff can assist with all phases, including admissions, financial management and administrative procedures during the program. Academically qualified individuals can be placed in their designated field of study at the University of Illinois or in any of a network of U.S. universities that have strong programs in soybean research and education and work in close

cooperation with INTSOY.

The Changing Role of INTSOY

During the past year INTSOY has been undergoing some of the following changes to lay a foundation for future activities:

- In recognition of the need to strengthen national and regional soybean programs, INTSOY has phased out its activities in Puerto Rico and transferred its plant breeder to Colombia to work in the Latin American Network with CIAT and the Colombian National Program (ICA). The microbiologist has been relocated at AVRDC to work more closely with Asian soybean scientists.
- INTSOY has increased cooperation with IITA, AVRDC, and IRRI to work towards the establishment of regional soybean networks for Africa, Asia, and Latin America and the Caribbean Basin.
- An International Observational Soybean Trial (ISOT) has been organized to provide more diverse germplasm to cooperators.
- A focus on marketing, processing, and utilization has been initiated to help develop balanced national soybean programs.
- Discussions have been held with national and international organizations about ways to improve communications and information exchange among soybean scientists.

INTSOY has recently received assurances of modest long-term funding from USAID. With these limited funds INTSOY plans to focus its activities in areas where INTSOY has unique expertise or a comparative advantage. These areas will be determined in consultation with scientists from national, regional, and international programs. We envision these areas to be as follows:

- Soybean processing and utilization - Major emphasis will be placed on simple techniques to produce soymilk and whole soybean extruded products and to extract soybean oil. A modest research program will be undertaken at the University of Illinois with strong extension and training linkages to scientists in Asia, Africa, and Latin America through the regional networks which are being established.
- Germplasm preservation, evaluation, and enhancement - INTSOY will work with IBPGR to help national programs collect, evaluate, and preserve soybean germplasm. INTSOY will support regional testing programs and link regional testing programs with appropriate international testing. We also believe that disease, insect, problem soil, and temperature stress screening trials should be established.

The enhancement work will be continued out of the headquarters at ICA/CIAT in Colombia. Major objectives of the breeding program will be to develop improved varieties for the tropical regions of South America and the Caribbean Basin. Biotechnology research will be undertaken at UIUC with a major focus on wide crosses for pest, disease, and stress resistance which will work towards long-term objectives of the enhancement program.

- Plant Protection - INTSOY scientists will conduct collaborative research on component technology and integrated pest management.

- Education and communication - INTSOY will continue to cosponsor conferences and workshops and conduct training programs. The training programs will focus more on regional needs and therefore an increasing number will be held in collaboration with national and other international organizations. A greater effort will be placed on the degree training of soybean scientists who will give leadership to soybean industries being established in an increasing number of countries. An international soybean research newsletter will be initiated collaboratively with AVRDC and IITA to provide a communication mechanism for soybean scientists, producers, processors, and policy makers to exchange information about soybeans.

Appendix I: Summary Information about International Soybean Trials

Item	Totals
Total number of cultivars used in ISVEX trials to date	148
Total number of countries contributing cultivars	28
Total number of breeders contributing cultivars	119

Appendix II: International Soybean Variety Experiment (ISVEX) by Region

<u>Regions</u>	<u>Number of Countries Per Year</u>											Total Countries Per Region
	<u>1973</u>	<u>1973</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	
Africa	7	11	25	26	29	27	19	29	26	29	27	45
Asia	10	10	11	8	12	14	15	13	14	14	11	19
Europe	0	1	4	6	5	7	6	4	6	4	6	13
MesoAmerica	5	8	9	7	3	8	7	7	8	11	13	22
Middle East	2	5	5	5	4	7	7	5	8	7	6	11
North America	0	0	1	1	1	1	1	1	1	1	1	1
Oceania	0	0	2	3	4	5	2	2	2	5	1	7
South America	4	5	10	9	13	12	10	10	10	11	9	13
Total Countries Per Year	<u>28</u>	<u>40</u>	<u>67</u>	<u>65</u>	<u>71</u>	<u>81</u>	<u>67</u>	<u>71</u>	<u>75</u>	<u>82</u>	<u>74</u>	
Total Number of Countries Participating in ISVEX												<u>131</u>

Appendix III: Countries Cooperating in ISVEX

COUNTRY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
AFGHANISTAN	X	X	X								
ALGERIA			X	X	X	X	X	X	X	X	
ANGOLA		X									
ANTIGUA											X
ARGENTINA			X	X	X	X	X	X	X	X	X
AUSTRALIA					X					X	
AUSTRIA							X		X		
AZORES					X	X	X	X	X		
BAHAMAS			X	X						X	
BANGLADESH			X	X	X	X	X	X	X	X	X
BELIZE	X		X		X		X	X	X		
BENIN			X	X	X			X	X		
BHUTAN								X	X		
BOLIVIA		X	X	X	X	X	X	X	X	X	X
BOTSWANA				X	X	X	X				
BRAZIL			X	X	X	X	X	X	X	X	X
BRUNEI									X		
BURMA					X	X	X	X		X	X
BURUNDI			X	X		X			X		
CAMEROON		X	X	X	X	X		X	X	X	X
CENTRAL AFRICAN REPUBLIC				X	X					X	X
CHILE			X	X	X	X	X	X	X	X	X
CHINA										X	X
CHINA (TAIWAN)	X	X	X		X	X	X	X	X	X	X
COLOMBIA	X	X	X	X	X	X	X	X		X	X
CONGO			X	X	X	X					
COSTA RICA	X	X	X			X	X	X	X	X	X
CUBA							X			X	X
CYPRUS									X	X	
CZECHOSLOVAKIA					X	X	X		X	X	X
DOMINICA											X
DOMINICAN REPUBLIC		X		X		X	X			X	
ECUADOR	X	X	X	X	X	X	X	X	X	X	X
NEW COUNTRIES	6	4	9	2	4	0	2	1	2	1	2

Appendix III (cont'd) ISVEX: Cooperating Countries by Year

COUNTRY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
LIBERIA					X			X	X	X	
LIBYA							X	X			
MALAGASY(MADAGASCAR)						X		X	X	X	X
MALAWI						X	X	X			X
MALAYSIA	X	X			X	X	X	X	X	X	
MALI			X	X				X	X		X
MARTINIQUE			X								
MAURITIUS			X		X	X		X	X	X	X
MEXICO	X	X		X		X	X	X		X	X
MOROCCO					X	X	X	X	X	X	X
MOZAMBIQUE								X		X	
NEPAL		X	X	X	X	X	X	X	X	X	X
NEW CALEDONIA				X	X	X			X	X	
NEW HEBRIDES				X						X	
NEW ZEALAND						X					
NICARAGUA	X	X	X	X						X	
NIGER			X	X	X	X					
NIGERIA		X		X	X						
PAKISTAN	X	X	X	X	X	X	X	X	X	X	X
PANAMA		X	X					X			
PARAGUAY				X	X	X	X	X	X	X	X
PERU	X		X	X	X	X	X	X	X	X	X
PHILIPPINES	X	X	X	X	X	X	X	X	X	X	X
POLAND				X	X	X		X			
PORTUGAL				X	X	X	X	X	X	X	X
PUERTO RICO	X	X		X			X	X	X	X	X
REUNION			X							X	X
RWANDA			X		X	X	X	X	X	X	X
SAUDI ARABIA		X	X	X	X	X	X		X	X	X
SENEGAL			X		X	X				X	X
SIERRA LEONE	X	X	X				X	X	X		X
SOMALIA	X		X	X	X	X	X	X	X	X	X
SOUTH AFRICA											X
NEW COUNTRIES	9	4	7	5	2	3	1	1	0	0	1

Appendix III (cont'd) ISVEX: Cooperating Countries by Year

COUNTRY	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
SPAIN		X	X	X							
SRI LANKA	X	X	X	X	X	X	X	X	X	X	X
ST. KITTS									X		
ST. LUCIA											X
ST. VINCENT						X					X
SUDAN				X	X	X	X	X	X	X	X
SURINAM					X	X	X		X		
SWAZILAND		X	X	X	X					X	
SYRIA	X				X	X	X	X	X	X	
TAHITI			X	X	X	X	X			X	
TANZANIA	X		X	X	X	X		X	X	X	X
THAILAND	X	X	X	X	X	X	X	X	X	X	X
TOGO			X	X	X				X	X	
TONGA ISLANDS						X		X			
TRINIDAD & TOBAGO		X	X	X		X	X		X		
TUNISIA						X	X				
TURKEY						X	X	X	X	X	X
UGANDA				X	X	X			X		
UNITED STATES			X	X	X	X	X	X	X	X	X
UPPER VOLTA			X	X	X	X		X	X	X	X
URUGUAY				X	X				X	X	
USSR							X				
VENEZUELA		X	X		X	X		X		X	X
VIETNAM	X					X	X		X	X	
VIRGIN ISLANDS						X					
WEST GERMANY											X
YEMEN									X		
YUGOSLAVIA			X	X						X	X
ZAIRE				X	X	X	X	X	X	X	X
ZAMBIA		X	X	X	X	X	X	X	X	X	X
ZIMBABWE		X	X	X	X	X	X	X	X	X	X
NEW COUNTRIES	5	6	5	4	1	5	1	0	2	0	2

Appendix IV: Countries which have Released ISVEX Cultivars for Commercial Production

Asia

- Bangladesh - Davis, Bragg, Lee-74, I. Pelican
India - Jupiter, Bragg, Hardee, I. Pelican
Nepal - Hill, Hardee, Ransom
Pakistan - Williams, Lee, Bragg, Bossier, I. Pelican
Philippines - Clark-63
Sri Lanka - Bossier, I. Pelican, Davis

Africa

- Algeria - Attona, Kingsoy, Hudson
Cameroon - Coker-240
Ethiopia - Davis, Coker-240, Williams
Gabon - Jupiter
Ghana - Jupiter, Bossier
Madagascar - UFV-1, Alamo, Jupiter, Davis
Malawi - Forrest, Davis, Bossier, Hardee, Williams, Clark, Calland, Columbus
Mozambique - UFV-1

Latin America

- Argentina - Davis, Bragg, Hood, Williams, Forrest, Halesoy 71, Foster
Bolivia - Bossier, Riletto, Davis, UFV-1
Costa Rica - Jupiter, Siatsa 184-A
Ecuador - Jupiter, Davis
Guyana - Jupiter, Ecuador 2, IRAT-ISRA 444/73
Mexico - Jupiter
Paraguay - Bragg, Davis, Bossier

Other

- Australia - Buchanan, Durack
Israel - Williams
Turkey - Calland, Mitchel, Amsoy 71, Williams, Corsoy

Appendix V: AID Mission Supported Country Programs Under the AID Basic Ordering Agreement - Task Order Format

Bangladesh. AID/BOA-1109 Task Order #1, (completed)--(.75 work month service).

Ecuador. AID/BOA-1109 Task Order #3, (completed)--(1 work month service).

Egypt. AID/BOA-1109 Task Order #8, (completed)--(8 work months service).
AID/NE-C-1677, (completed)--(8.75 work months service).

Ghana. AID/BOA-1109 Task Order #7, (completed)--(4 work months service).

Guyana. AID/BOA-73-30 Task Order #1, (completed)--(10.5 work months service).

Panama. Various Purchase Orders, Panama (completed)--(2 work months service).

Peru. AID/BOA-73-30 Task Order #3, (completed)--(.25 work month service).
AID/BOA-1109 Task Order #2, (completed)--22 work months service).

Uruguay. AID/BOA-73-30 Task Order #2, (completed)--.5 work month service).

Thailand. AID/BOA-1109 Task Order #5, (completed)--(3 work months service).

Zaire. AID/BOA-1109 Task Order #4, (completed)--(1 work month service).
AID/BOA-1109 Task Order #6, (completed)--(3 work months service).

Appendix VI: INTSOY Publication Series

- No. 1--Selected Literature of Soybean Entomology, George L. Godfrey, ed. 1974. Out of print.
- No. 2--Proceedings of the Workshop on Soybeans for Tropical and Subtropical Conditions. 1974.
- No. 3--A Case Study of Expeller Production of Soybean Flour in India, S. W. Williams and K. L. Rathod. 1974.
- No. 4--Soybean Processing in India: A Location Study on an Industry to Come, Mattias von Oppen. 1974.
- No. 5--Potential Production of Soybeans In North Central India, S. W. Williams, W. E. Hendrix, and M. K. von Oppen. 1974.
- No. 6--Soybean Production, Protection, and Utilization: Proceedings of a Conference for Scientists of Africa, the Middle East, and South Asia, D. K. Whigham, ed. 1975.
- No. 7--An Annotated Bibliography of Soybean Diseases, J. B. Sinclair and O. D. Dhingra. 1975.
- No. 8--International Soybean Variety Experiment, First Report of Results, D. K. Whigham. 1975.
- No. 9--Soybean Cultivars Released in the United States and Canada: Morphological Descriptions and Responses to Selected Foliar, Stem and Root Diseases, T. Hymowitz, S. G. Carmer, and C. A. Newell, comp. 1976.
- No. 10--Expanding the Use of Soybeans: Proceedings of a Conference for Asia and Oceania, R. M. Goodman, ed. 1976.
- No. 11--International Soybean Variety Experiment, Second Report of Results, D. K. Whigham. 1976.
- No. 12--Rust of Soybeans: The Problem and Research Needs, Report of a workshop held in Manila, Philippines, February 28-March 4, 1977, R. E. Ford and J. B. Sinclair, eds. 1977.
- No. 13--Pedigrees of Soybean Cultivars Released in the United States and Canada, T. Hymowitz, C. A. Newell, and S. G. Carmer. 1977.
- No. 14--Whole Soybean Foods for Home and Village Use, A. I. Nelson, M. P. Steinberg, and L. S. Wei, compilers. 1978.
- No. 15--International Soybean Variety Experiment, Third Report of Results, D. K. Whigham and W. H. Judy. 1978.
- No. 16--International Soybean Variety Experiment, Fourth Report of Results, W. H. Judy and D. K. Whigham. 1978.
- No. 17--The Literature of Arthropods Associated with Soybean. V. A Bibliography of Heliothis zea (Boddie) and H. virescens (F.) (Lepidoptera:Noctuidae), J. Kogan, D. K. Sell, R. E. Stinner, J. R. Bradley, Jr., and M. Kogan. 1978.
- No. 18--Sources of Resistance to Selected Fungal, Bacterial, Viral and Nematode Diseases of Soybeans, O. Tisselli, T. Hymowitz, and J. B. Sinclair. 1979.
- No. 19--International Soybean Variety Experiment, Fifth Report of Results, 1977, W. H. Judy and H. J. Hill. 1979.
- No. 20--Irrigated Soybean Production in Arid and Semi-Arid Regions. Proceedings of a Conference Held in Cairo, Egypt, W. H. Judy and J. A. Jackobs. 1981.
- No. 21--International Soybean Variety Experiment, Sixth Report of Results, 1978, W. H. Judy, J. A. Jackobs, and E. A. Englebrecht-Wiggans. 1981.

Appendix VI: (cont'd)

- No. 22--Soybean Seed Quality and Stand Establishment: Proceedings of a Conference of Scientists for Asia, J. B. Sinclair and J. A. Jackobs. 1982.
- No. 23--International Inoculant Shipping Evaluation, R. S. Smith, W. H. Judy, and W. C. Stearn. 1983.
- No. 24--International Soybean Variety Experiment, Seventh Report of Results, 1979. J. A. Jackobs, M. D. Staggs, and D. R. Erickson. 1983.
- No. 25--Soybean Research in China and the United States. Proceedings of the First China/USA Soybean Symposium and Working Group Meeting, B. J. Irwin, J. B. Sinclair, and Wang Jin-ling, eds. 1983.
- No. 26--International Soybean Variety Experiment, Eighth Report of Results, 1980-1981, J. A. Jackobs, C. A. Smyth, and D. R. Erickson.

Appendix VII: Formal and Informal Relations with National and International Organizations

INTSOY has demonstrated that administrative mechanisms can be developed for cooperation with national and international organizations. Memoranda of Understanding have been completed with the following organizations.

1. Formal Relationships

International Institute of Tropical Agriculture (IITA), Nigeria. This provides a means for INTSOY to work with and through an international center with soybeans as part of their mandate. In late 1979 a project was initiated to supply IITA with varieties of virus-free soybean seed grown in Puerto Rico.

Asian Vegetable Research and Development Center (AVRDC), Taiwan. General objectives similar to IITA. AVRDC was a joint sponsor of the February 1976 Thailand regional conference and the Soybean Rust Workshop in the Philippines in February 1977. They now host the work of the INTSOY microbiologist.

Office of Rural Development, Ministry of Agriculture and Fisheries, Korea. Korea had significant experience in soybean production and has an aggressive crop development program that includes soybeans. Financing is through a combination of internal and external resources. Cooperation provides a technological bridge between the temperate and tropical areas of the Orient and Asia.

Philippine Council for Agriculture and Resources Research and Development, (PCARRD), Los Banos, Philippines. This agreement links INTSOY with the Philippine institution charged with the responsibility of promoting a systematic approach in the planning, coordination, direction and conduct of national agricultural research programs, and supporting a national network of research centers and stations for commodity research programs. PCARR served as host sponsor of the Soybean Rust Workshop held in February 1977.

Fundacao Instituto Agronomico do Parana (IAPAR), Londrina, Parana, Brasil. This Memorandum was developed when IAPAR had research responsibility for soybeans, as well as other commodities, in Parana. Cooperation continues along with expanded work with EMBRAPA's Centro Nacional de Pesquisa d Soja at the same location.

Instituto Nacional de Investigaciones Agropecuarias, Ecuador. This agreement provides for education and training of personnel to support the expansion of soybeans in Ecuador.

International Agricultural Development Service (IADS). This IADS-INTSOY agreement provides for cooperative efforts with national organizations to improve research organizations, develop plans and projects, train personnel, and organize conferences and workshops.

Instituto Colombiano Agropecuario (ICA), Colombia. This agreement provides for cooperative efforts in education,

Appendix VII (cont'd)

training, and interchange of scientists. Principal activity under this agreement has been the annual soybean short course developed for soybean workers of Spanish-speaking Latin America.

Centro Internacional de Agricultura Tropical (CIAT) and Instituto Colombiano Agrpecuario (ICA). In 1983 a Memorandum of Agreement was signed for regional research. The INTSOY plant breeder is collaborating with the ICA breeder in the development of improved germplasm for the region.

In addition, a "Statement of Understanding" was signed to define areas of cooperation between INTSOY and the University of Hawaii's program of Nitrogen Fixation of Tropical Agricultural Legumes (NifTAL).

2. Informal Relationships

The following list illustrates the variety of organizational linkages and the areas of cooperation:

Organizations in more than 100 countries through International Soybean Variety Evaluation Experiment (ISVEX).

Southeast Asia Regional Center for Graduate Study and Research in Agriculture (SEARCA), Philippines (ISVEX).

International Rice Research Institute (IRRI), Philippines.

Food and Agriculture Organization of the United Nations (FAO), Rome (ISVEX, conferences, training, Sri Lanka, Iraq).

United Nations Development Program (Sri Lanka).

UNICEF and CARE (Sri Lanka).

Inter-American Institute of Agricultural Sciences of the Organization of American States (Haiti).

Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres (IRAT), Paris (ISVEX, IITA, individual country programs).

Nitrogen Fixation by Tropical Agricultural Legumes (NifTAL), University of Hawaii/USAID (microbiology, Rhizobium japonicum, etc.).

USDA Regional Soybean Laboratories at Urbana and Stoneville; Northern Regional Research Center, Peoria; Mayaguez Institute of Tropical Agriculture; and other USDA personnel.

Kansas State University, Food and Feed Grain Institute.

Mississippi State University, Seed Technology Laboratory.

Mississippi Consortium on Soils of the Tropics (Cornell

University, University of Hawaii, North Carolina State

University, Prairie View A & M College, University of Puerto Rico).

North Carolina State University--NCSU/USAID root-knot nematode project.

U.S. university personnel on Task Orders and other projects--

Iowa State University, Purdue University, Texas A & M

University, University of Florida, Cornell University,

Mississippi State University, University of Missouri,

University of Arkansas, and University of Georgia.

Appendix VII (cont'd)

Private sector employers on Task Orders and other projects--
Swift and Company; Potash Institute of North America;
Agricultural Laboratories, Inc.; Soy Pro, International;
Central Iowa Bean Mill, Inc.