

**P R O G R A M     D I R E C T O R Y**

**A Directory of S&T Office of Agriculture services**

Office of Agriculture  
Bureau of Science & Technology  
(S&T/AGR)

September 9, 1987  
OFFICE OF AGRICULTURE (S&T/AGR)  
Content of FY 88 Program Directory  
for A.I.D. Missions Use

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**OVERVIEW STATEMENT**

BUREAU FOR SCIENCE AND TECHNOLOGY

OFFICE OF AGRICULTURE (S&T/AGR)

Introduction

The focus of the Agency's agriculture, rural development and nutrition program is to increase the incomes of the poor majority and to expand the availability and consumption of food while maintaining and enhancing the natural resources base. It is the responsibility of the S&T Office of Agriculture to implement this focus through the management and direction of its centrally funded research portfolio in agriculture - crops, livestock and fisheries - and natural resources. The purpose of this directory is to update the user about the ST/AGR program and the ways the Office works with A.I.D. field missions to meet Agency goals.

In addressing the goals of the Agency's agriculture focus, S&T/AGR:

Mobilizes the expertise of U.S. universities, other U.S. Government agencies, and non-government organizations to conduct research and provide technical assistance;

Manages A.I.D.'s technical, scientific and financial relationships with the international agricultural research centers; and,

Supports the strengthening of national research capability in LDCs, and of international research networks linking scientists in developed and developing countries and in international research centers.

For management purposes, the S&T/AGR portfolio is divided into four units:

The Agricultural Production Division incorporates research activities in the areas of crops, livestock, post-harvest technology and utilization.

The Renewable Natural Resources Division incorporates research activities in the areas of water use, soil management, fisheries, and soil microbiology.

The Economic Policy and Planning Division incorporates research activities in the areas of agricultural policy and farming systems.

The Consultative Group for International Agricultural Research Centers Staff provides the Agency's technical management of the International Agricultural Research Centers.

To facilitate review of S&T/AGR research portfolio, the directory presents each Division's projects as to: purpose, services available, funding, components/activities, project accomplishments, future activities/plans, outputs immediately available, and contact for support. A cable or letter to the S&T/AGR project manager outlining the nature of the Mission request for support, the level of effort and an estimate of the time frame will begin the process of accessing services from S&T/AGR projects. While individual project funding arrangements vary, most are designed with "buy-in" capacity.

The S&T/AGR agriculture research project portfolio is a resource available for Missions to use at the country level in meeting Agency agriculture focus goals. As you make use of S&T/AGR services, we encourage your comments as to performance of S&T/AGR projects in your country and to areas of need to which S&T/AGR should seek to be responsive in the future through the reinforcing of ongoing initiatives or the initiation of new research efforts. In short, we always look forward to feed-back from the field.

OFFICE OF AGRICULTURE  
ACTIVITY AREAS AND PERSONNEL

<u>Area</u>	<u>Personnel</u>
<u>Director</u> .....	D. Bathrick
<u>Program</u> .....	E. Roche; B. Beckett; M. Blakeney
<u>Operations</u> .....	L. Schulze
<u>Communications</u> .....	H. LeSieur
<u>CGIAR</u>	
<u>Research and International Centers</u> ..	D. Dalrymple, RSSA-USDA R. Bertram
<u>Agricultural Production</u>	
<u>Chief</u> .....	H. Hortik
<u>Cereal Grains</u> .....	F. Mertens
<u>Soybeans &amp; Grain Legumes</u> .....	L. Schulze; H. Hortik
<u>Crop Protection/Pesticides</u> .....	C. Collier B. Waite, RSSA-USDA
<u>Livestock Production &amp; Health</u> .....	J. Turk
<u>Horticulture/Extension Agronomy</u> .....	H. Hortik
<u>Postharvest Food Loss</u> .....	F. Mertens
<u>Biotechnology</u> .....	J. Cohen
<u>Renewable Natural Resources Management</u>	
<u>Chief</u> .....	T. Gill
<u>Soil Management</u> .....	T. Gill; J. Malcolm
<u>Water Management</u> .....	W. Fitzgerald; R. Meyer
<u>Fertilizer Technical Assistance</u> .....	J. Malcolm
<u>Aquaculture and Fisheries</u> .....	R. Neal; L. Trott, RSSA-NOAA K. Osborn, RSSA-NOAA
<u>Biotechnology, Biological Nitrogen Fixation and Tissue Culture</u> .....	L. Frederick
<u>Economic Policy and Planning</u>	
<u>Chief</u> .....	V. Cusumano
<u>Agriculture Sector</u>	
<u>Analysis/Planning</u> .....	V. Cusumano
<u>Food Policy</u> .....	P. Church
<u>Agriculture Data Systems</u> .....	P. Church
<u>Farming Systems/Production</u>	
<u>Economics</u> .....	R. Castro
<u>Natural Resources Economics</u> .....	D. Piper

**III. DIVISION OF AGRICULTURAL PRODUCTION**

SPRING AND WINTER WHEAT

Project No: 931-0621

PACD: 8/31/89

A. PURPOSE

To help developing countries for which winter wheat and winter barley are major food grains, in obtaining and using the latest improved winter wheat and winter barley germplasm as well as the technology to increase yields on small farms and in adverse environmental conditions.

B. SERVICES AVAILABLE

Through bilateral arrangements with Oregon State University, USAID missions and host country governments can access specialized services for collaborative interdisciplinary research and training programs using the enhancement of germplasm of winter and facultative wheat and barley.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$5,200,000	0
Obligation thru FY 86	400,000	0
FY 87 OYB	300,000	0
FY 88 anticipated (available)	300,000	0

D. COMPONENTS/ACTIVITIES

Research 60%; Training 40%.

E. PROJECT ACCOMPLISHMENTS

1. Implementation began in 1976 with funding to date of \$4.0 million. Geographic concentration has been: Africa, 15%; Latin America/Caribbean, 20%; Asia, 15%; and the Near East, 50%. The ecological zones covered are: Arid/semi-arid and rainfed.

2. Linkages with research centers in 45 countries have yielded 7,000 germplasms collected and evaluated; from these, 100,900 new spring and winter wheat crosses for genetic diversity were accomplished.

3. 110 students from 22 countries have been trained: 43 MSs, 44 PhDs in LDCs, 27 PhDs in the U.S.

4. Eight new winter wheat varieties and 174 new breeding lines with superior nutritional properties have been tested in 47 countries and are being considered for possible release. Wheat production in Turkey has risen by 10 million MT since the beginning of this program.

F. FUTURE ACTIVITIES/PLANS

1. Continued collection and testing of germplasm and crosses
2. Several new varieties currently being tested worldwide will be made available for release in the next few years.
3. The project will phase out winter wheat and will concentrate on winter barley.

G. OUTPUTS IMMEDIATELY AVAILABLE

1. Reports to plant breeders on more than 2000 germplasms through the computerized data bank.
2. Reports on results of the annual international winter and spring wheat screening nurseries.
3. Improved germplasm of winter and facultative wheat and barley with respect to nutrition, yields and biological stresses.

H. CONTACTS FOR SUPPORT

Project Manager

Mr. Frank Mertens  
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Washington, D.C. 20523  
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Project Director

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Project No: 931 1254

PACD: 6/30/90

**A. PURPOSE**

To improve the living conditions of small farm producers in developing countries and to increase the availability of low cost, nutritious sorghum and millet in the market place for the rural and urban poor.

**B. SERVICES AVAILABLE**

Specialized services can be provided to A.I.D. field missions through direct bilateral arrangements with the University of Nebraska.

**C. FUNDING**

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$27,500,000	\$45,000
Obligation thru FY 86	24,700,000	0
FY 87 OYB	2,185,000	0
FY 88 anticipated (available)	2, 00,000	45,000

**D. COMPONENTS/ACTIVITIES**

Research 60%; Technical Assistance 5%; Training 35%.

**E. PROJECT ACCOMPLISHMENTS**

1. The sorghum/millet program began in 1979 with worldwide emphasis in Africa, 65%; Latin America/Caribbean, 20%; Asia, 10% and the Near East, 5%. The ecological zones included in the research agenda are: Tropical/sub-tropical, Arid/semi-arid, Rainfed and Irrigated.

2. Collaborative research has taken place in Sudan, reflected in sorghum and millet improvement. In Mexico a workshop on sorghum/millet farming systems has been carried out.

3. Research and technical assistance to LDC's has been provided in the form of conducting research and graduate training in the U.S. and the holding of workshops in the LDC's.

**F. FUTURE ACTIVITIES/PLANS**

The sorghum/millet CRSP will continue to give technical and research assistance to LDC's on a buy-in basis from missions. Further training and research in sorghum/millet development and production will continue.

**G. OUTPUTS IMMEDIATELY AVAILABLE**

- Annual reports
- Trip reports (various countries)
- Workshop proceedings

H. CONTACTS FOR SUPPORT

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Project Director

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Project No: 931-1310

PACD 9/30/89

A. PURPOSE:

To improve the living conditions of small farm producers in developing countries and to increase the availability of low cost, nutritious food in the market place for the rural and urban poor.

B. SERVICES AVAILABLE

USAID missions can access specialized services through bilateral arrangements with Michigan State University.

<u>C. FUNDING</u>	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$27,900,000	0
Obligation thru FY 86	19,300,000	0
FY 87 OYB	3,035,000	0
FY 88 anticipated (available)	2,600,000	0

D. COMPONENTS/ACTIVITIES

Research 60%; Technical Assistance 5%; Training 35%.

E. PROJECT ACCOMPLISHMENTS

1. Project funding began in 1981 with the life of project funding to reach \$27.9 million over the eight year life of the project. Project concentration is equally divided between Africa and Latin America/Caribbean for the following ecological zones: Arid/semi-arid, Humid, Rainfed and Irrigated.

2. Through access to new germplasm, improved cultivars have been developed and released. Senegal released 700 MT of beans seed to 100,000 small farmers whose production has increased from 16,000 MT in 1984 to 80,000 MT in 1985.

3. Improved nutritional value and reduced firewood/fuel requirements have been incorporated into the new releases. More efficient nitrogen-fixing bean cultivars have made it possible to increase their yield and decrease their production costs.

F. FUTURE ACTIVITIES/PLANS

Further research is being done to find more efficient nitrogen fixing, higher yielding and high nutrition/low fuel requirement cultivars. Continued workshop and degree training in the U.S. and the LDC's will help to defeat the constraints in Bean/Cowpea production, availability and consumption.

G. OUTPUTS IMMEDIATELY AVAILABLE

- Annual reports
- Research highlights
- Special reports
- Newsletters
- Workshop and seminar proceedings
- Various journal articles

H. CONTACTS FOR SUPPORT

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STORAGE AND PROCESSING OF FRUITS AND VEGETABLES

Project No: 931-1323

PACD: 09/30/90

A. PURPOSE

To conduct adaptive research on the postharvest conservation of perishable fruits and vegetables, to provide technical assistance to LDC mission, to train graduate students and to collect and disseminate information on the postharvest conservation of perishables.

B. SERVICES AVAILABLE

Technical assistance is available to USAID missions and host country institutions for training in improved storage and handling practices for perishables and design of improved processing systems for perishables. Feasibility studies for efficient domestic marketing systems, loss assessments and documentation services also are provided on request by developing countries.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$5,415,000	\$4,500,000
Obligation thru FY 86	400,000	
FY 87 OYB	285,000	
FY 88 anticipated (available)	300,000	

D. COMPONENTS/ACTIVITIES

Research 15%; Technical Assistance 40%; Training 15%; Other 30%.

E. PROJECT ACCOMPLISHMENTS

The project was conceived as a long-term effort which began in 1980. The study is now in the middle of its second 5 year cooperative agreement with the University of Idaho.

A number of linkages have been established during the past 7 years. The research and development institutions include the following:

- CIAT; AVRDC; CIP; IFPRI
- Asian Development Bank
- McCormick & Atlanta Co./Grenada Nutmeg Marketing Assoc./marketing of spices in the U.S.
- Visayas State College of Agriculture, Philippines
- University of Virgin Islands
- Appropriate Technology Institute
- Association of SE Asian Nations (ASEAN)-Perishable Loss Methodology Studies
- Weyerhaeuser Corporation - packaging studies for perishable goods transport in the Caribbean

Highlights and Accomplishments to date include:

- Postharvest Institute for Perishables (PIP) in its first 6 years of operation has sent over 75 short-term technical assistance teams to over 30 countries.
- PIP has accumulated over 9,800 technical post harvest loss control documents in this library.
- PIP has shared 42,000 technical reports with 850 regular clients in 114 countries.

F. FUTURE ACTIVITIES/PLANS

- Development of a methodology for rapid appraisal of Postharvest perishable losses.
- Shrink wrap for control of fruit flies and alternative treatment for Ethylens Dibromide Fumigation.
- Inexpensive solar refrigeration for LDCs
- Quality (oil, fat, moisture) factors of Nutmeg & Marketing
- Postharvest handling and refrigeration of tropical fruits in Thailand
- Rapid market appraisal of fruit and vegetable marketing systems in Jordan
- Thailand fruit & vegetable marketing study - export of perishables to Asia & European markets.
- Dasheen research and marketing in Jamaica

G. OUTPUTS IMMEDIATELY AVAILABLE

1. PIP Library has 9,800 technical postharvest loss control documents.
2. PIP presents an annual postharvest course for foreign agriculturalists.
3. Inexpensive solar dryer with auxiliary heat (to use for combustion of agricultural wastes) for drying fruits and vegetables.
4. Methodology manual for postharvest loss assessment for perishables (this is now being tested in 6 LDCs.
5. Technical assistance on postharvest loss control, storage, handling, packaging and marketing of perishables.

H. CONTACTS FOR SUPPORT

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Project Director

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PEANUT COLLABORATIVE RESEARCH SUPPORT PROGRAM (CRSP)

Project No: 936-4048

PACD: 06/30/90

A. PURPOSE

The project coordinates the collaborative resources of LDC and U.S. institutions in a long-term research program to relieve constraints on the production and utilization of the peanut in LDCs.

B. SERVICES AVAILABLE

Technical assistance and short-term to degree training are now available. On a buy-in basis, Missions may acquire the following: short-term technical assistance, degree training, and short-term training in the areas of breeding for disease resistance, insect resistance and drought tolerance; integrated pest management including insect, viruses, and foliar diseases; rhizobia; mycorrhizae; mycotoxins; and post-harvest handling.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$13,887,697	\$150,000
Obligation thru FY 86	6,800,000	
FY 87 OYB	1,600,000	
FY 88 Anticipated (available)	1,700,000	

D. COMPONENTS/ACTIVITIES

Research 60%; Technical Assistance 5%; Training 35%

E. PROJECT ACCOMPLISHMENTS

PROJECT ORIENTATION - Initiated in 1982 with the University of Georgia as the management entity, Alabama A&M University, the University of Georgia, North Carolina State University, and Texas A&M University participate as subgrantee institutions. Strong linkages have been made with ICRISAT, the only IARC with a peanut mandate, and national research programs in Africa, Asia and the Caribbean. Active collaborative research programs are in place, workshops have been conducted and short- and long-term training activities have prepared hundreds of peanut researchers for productive futures as peanut scientists.

SEMI-ARID TROPIC (SAT) ENVIRONMENT - New peanut cultivars have been found to meet the tests imposed by diseases, insects, drought and heat. Some of the lines are equal to or better than local cultivars in seed and hay yields, an indication of drought tolerance. Many of the lines also show an increased number of plants surviving until harvest, a major contribution to the yield potential. Also, the percentage of good seed at harvest is higher in some of the improved lines. Without a doubt, any improved lines developed to survive the harsh SAT environment will be of interest to the peanut farmer of the U.S., another peanut growing area under the constant threat of drought.

PEANUT FOLLOWING RICE - The peanut, a legume, fixes nitrogen for its own use and for the subsequent crop. In Asia, often the rice paddy lies fallow following rice harvest, necessitating the application of nitrogen to maintain good yields. By following rice with peanuts, extra food or available income is provided for the subsistence farmer. Breeding and selecting peanut lines have shown improvements in the performance of new cultivars following rice.

CONTROL OF FOLIAR AND SOIL DISEASES - Peanut CRSP funded disease surveys in Senegal, the Philippines and Thailand provide a focus for breeding and cultural control efforts. Studies on leafspot, rust and other foliar diseases conducted in Thailand and the Philippines have helped to increase our understanding of weather-based timing of fungicide applications. Pathologists and breeders throughout the Peanut CRSP collaborate to utilize the survey data to assist in controlling pathogens and, thereby, stabilize or increase yields.

AFLATOXIN MANAGEMENT WITH A MINI-COLUMN - Current techniques to analyze aflatoxins pose a problem in LDCs because the best procedure requires expensive and sophisticated equipment needing specialized maintenance and the traditional mini-column procedures are only semi-quantitative. A new mini-column was developed by the Peanut CRSP toxicology team by adding bentonite clay to the column packing material resulted in a more concentrated and clearly defined layer of fluorescence. The mini-column also simplifies the procedure for the rapid analysis of aflatoxins in crude peanut oil. This new procedure will be contained in a portable unit to provide rapid on-site analysis of the contaminated, crude peanut oil used in Senegalese villages.

AFLATOXIN NUT REMOVAL, OF SORTS - Any aflatoxin-contaminated peanut that reaches the processor must be removed or decontaminated prior to processing. Aflatoxin contaminated peanuts can be hot-water blanched, visually inspected and sorted to remove damaged seeds. This simple sorting technique can be effectively adapted for use by home- and cottage-level processors.

#### F. FUTURE ACTIVITIES

The Peanut CRSP will continue to consolidate its operations to deal with funding realities. The new ICRISAT Sub-Saharan Research Center in Niger has been planned in coordination with the Peanut CRSP and future research, training and outreach activities will continue with the two programs continuing to complement each other. Benefits from the germplasm collected by the Peanut CRSP to the U.S. peanut industry will become apparent as insect, virus, disease and drought resistance is incorporated into U.S. peanut varieties.

#### G. OUTPUTS IMMEDIATELY AVAILABLE

1) International Arachic Newsletter, 2) State of the art report on peanut research, 3) Annual reports, 4) Trip Reports, 5) Research publications reprints

H. CONTACTS FOR SUPPORT

Project Manager

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SOYBEAN UTILIZATION & RESEARCH

Project No: 936-4132

PACD: 12/31/89

**A. PURPOSE**

The research is to assist private businesses and government entities in developing countries to develop, test, adapt and disseminate new soy products and soybean processing techniques with particular concern for the needs of the malnourished.

**B. SERVICES AVAILABLE**

The following services are available on a buy-in basis.

1. Training programs in soybean utilization - short-term.
  - six week soybean utilization course at UIUC each summer.
  - degree training in soybean utilization with hands-on experience in public and private sector laboratories.
2. Short-term technical assistance:
  - short-term technical assistance is available by UIUC professionals and private sector individuals in the areas of processing, handling, packaging and economic analysis of products as developed.

<b>C. <u>FUNDING</u></b>	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$5,950,000	\$560,000
Obligation thru FY 86		14,000
FY 87 OYB	550,000	0
FY 88 anticipated (available)	600,000	0

**D. COMPONENTS/ACTIVITIES**

Research 80%; Technical Assistance 20%; Training 0%

**E. PROJECT ACCOMPLISHMENTS**

Processing Research: Research funded under the project demonstrates that 75 percent of the edible soy oil can be removed from soybeans with only one pass through a mechanical soy expeller by first conditioning the whole or dehulled beans in an extruder. The process produces a high-quality, natural oil and a partially defatted meal suitable for both animal feed and human food products. The process has a low energy requirement, can be conducted with low precision machinery and has wide application for small enterprises in the U.S. and abroad.

New Product Development: Even though the soy foods are high in protein content and contain the favorable, low saturated and no cholesterol oil, product development has taken a great step forward with the UIUC research on blanching dry beans in boiling water containing a small amount of sodium bicarbonate. This process inactivates the enzyme that causes the strong beany flavor normally associated with soy foods, destroys antinutritional agents and tenderizes the beans. Improved snack foods, soups and soy flour for weaning foods, as well as new products such as rice/soy and corn/soy blends have been developed.

New Frozen Foods Product: First results of field and laboratory testing on the processing and marketing of frozen green, raw soybeans for the U.S. and other countries with frozen food markets are encouraging. Harvesting problems for this product which has twice the protein of peas or lima beans have been largely overcome. Commercially available green bean picking equipment has proved highly successful during summer field tests. Progress is being made on improving depodding techniques. The product will provide another market for soybeans out of the traditional oil and/or meal markets.

Socio-economic Studies with Soybean Utilization: The project initiated studies on the cost analysis of extrusion cooking and mechanical expelling preceded by extrusion using data from India. Studies of the soyfood industry of Sri Lanka were initiated. A survey of "state of the art" whole soy processing and utilization research and development around the world has begun.

Coordination and Cooperation: The project cooperated on the establishment of the soybean utilization program at the International Institute for Tropical Agriculture (IITA) with emphasis on home and village processing working with IITA to help obtain a three-year grant of \$300,000 from IDRC to fund a cooperative soybean utilization program with the Nigerian government and IITA. The project responded to hundreds of requests for more information about soyfood processing from more than 30 countries during the last year. More than 100 visitors from 20 different countries visited the UIUC facilities from foreign industry groups, foundations, commodity groups and private voluntary organizations.

Training and Communications: A six-week soy utilization short course at UIUC in 1986 was attended by 12 participants from nine countries. Brochures, a newsletter, a special booklet on "The Soybean Solution: Meeting World Food Needs", popular articles and an audio-visual presentation have been developed.

Infrastructure and Support Above and Beyond Expectations: The University and the State of Illinois have committed \$1.4 million to completely remodel the project laboratories and pilot plant. The private sector has donated \$420,000 in equipment during CY 1987.

#### F. OUTPUTS IMMEDIATELY AVAILABLE

1) Booklet - Soybean Solution, Meeting World Food Needs; 2) Annual and trip reports; 3) Booklets on Home and Village Uses, Soyfood Preparation, Extension and Expelling, and Soymilk

#### G. FUTURE ACTIVITIES/PLANS

Further research and development in the area of soybean utilization is planned in order to create more products for high protein soyfoods in LDCs.

#### H. CONTACTS FOR SUPPORT

##### Project Manager

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COLLABORATIVE RESEARCH IN SPECIAL CONSTRAINTS AFFECTING  
THE PROGRAMS OF THE INTERNATIONAL AGRICULTURAL RESEARCH  
CENTERS (IARCS) SPECIAL CONSTRAINT RESEARCH

Project No: 936-4136

PACD: 09/30/90

A. PURPOSE

To provide a system that puts U.S. human and technological resources in the U.S. agricultural science community at the services of the IARC network.

B. SERVICES AVAILABLE

The project is designed to support the work of the IARCS.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$4,200,000	0
Obligation thru FY 86	\$700,000	0
FY 87 OYB	\$550,000	0
FY 88 anticipated (available)	\$500,000	0

D. COMPONENTS/ACTIVITIES

Research: 60%; Techassist: 30%; Training: 10%.

Linkages of U.S. public and private institutions with the following IARCS:  
International Maize and Wheat Improvement Center  
International Center for Tropical Agriculture  
The Asian Vegetable Research and Development Center  
International Institute of Tropical Agriculture  
International Rice Research Institute  
International Center for Agricultural Research in the Dry Area  
International Crops Research Institute for the Semi-Arid Tropics  
International Livestock Center for Africa  
International Laboratory for Research on Animal Disease  
International Centre of Insect Physiology and Ecology  
International Potato Center

E. PROJECT ACCOMPLISHMENTS

The project started in 1987. Its main accomplishments are as follows:

1. The project awarded thirteen (13) research projects to thirteen (13) different universities for collaborative research with eight (8) IARCS participating. See attached listing of these projects. Research results will be known in 2 to 3 years. The proposals for FY 87 have been received and are being evaluated.

2. This project is strengthening and increasing the research network between the IARCS and U.S. institutions and familiarizing researchers with LDC research problems.

3. The proposals funded in 1986 were:

- a) Evaluation, Management, and Utilization of Maize Germplasm and Breeding Systems. CIMMYT - University of Nebraska (C. O. Gardner).....\$84,688.
- b) The Urgent Requirement by IITA for a Taxonomic Resolution of *Cyrtospora* in Africa. IITA -Rutgers University (G.W. Wolfe).....\$49,852.
- c) Chemotherapy and Thermotherapy of In Vitro Potato and Sweet Potato Plantlets. CIP -- University of Wisconsin (S. A. Slack).....\$84,000
- d) Monoclonal Antibodies and Cloned DNA to Index for Sweet Potato and Yam Viruses. USDA/ARS, Beltsville - (R.H. Lawson) ..... \$143,610.
- e) Development of a Barley Yield Simulation Model, - ICARDA and IFDC - Michigan State University - (J. T. Ritchie) ..... \$110,000.
- f) Differentiating the Corn Stunt and Maize Bush Stunt Diseases in Latin America. - CIMMYT - Ohio State University - (D.T. Gordon)..... \$55,432.
- g) Reproductive Biology of *Striga hermonthica*. - ICRISAT - Old Dominion University - (L. J. Musselman)..... \$112,667.
- h) Removing Soil Structural Constraints to the Production of Maize and Legumes Following Rice. IRRI-University of Minnesota - (W.E. Larson)..... \$110,000.
- i) Determination of Plants from Wild Glycine Species to be Resistant to *Phakospora pachyrhizi*. AVRDC - University of Illinois (T. Hymowitz).....\$50,000.
- j) Introduction of Chromosome Segments from the D-Genome of Bread Wheat into Hexaploid Triticale. CIMMYT - Univ of Missouri (Y.P. Gustafson).....\$110,000
- k) Bacterial Leaf Blight of Rice: Serological and Epidemiological Studies. Univ of Hawaii (A. M. Alvarez).....\$149,000
- l) The Use of Plant Transformation Techniques to Modify the Protein Quality of Cassava. Louisiana State Univ (Y.M. Jaynes)....\$100,000
- m) Introduction of Pest Resistance into Mungbean via Unconventional Gene Transfer. Oregon State Univ. (D. W. Mok).....\$100,000
- Total.....\$1,259,232

(The International Agriculture Research Centers participating are: CIMMYT (2), IITA (2), CIP, ICARDA, IFDC, ICRISAT, IRRI, CIAT AND AVRDC).

F. FUTURE ACTIVITIES/PLANS

Annual award of four to five new research projects.

G. OUTPUTS IMMEDIATELY AVAILABLE

Annual research reports.

H. CONTACTS FOR SUPPORT

Project Manager

Mr. Frank Mertens  
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Washington, D.C. 20523  
Phone: 703-235-1497

Project Director

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USDA/CRSP  
Morrill Bldg.,  
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Washington, D.C. 20250  
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IPM AND ENVIRONMENT PROTECTION INCLUDING BIO-CONTROL

Project No: 936-4142

PACD: 9/30/90

A. PURPOSE

Provide technical assistance, training, research and networking to LDCs in the areas of pest and pesticide management.

B. SERVICES AVAILABLE

USAID Missions can access specialized services of researchers through bilateral arrangements with the University of Maryland.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$5,800,000	0
Obligation thru FY 86:		0
FY 87 OYB:	475,000	0
FY 88 anticipated (available):	520,000	0

D. COMPONENTS/ACTIVITIES

Technical Assistance 65%; Training 10%; Networking 10%; Research 15%.

E. PROJECT ACCOMPLISHMENTS

Funding began in 1986 under an agreement with the University of Maryland.

F. FUTURE ACTIVITIES/PLANS

1. Aid to LDC's:

The project will conduct a regional seminar/workshop in pest and pesticide management and conduct training courses in crop loss assessment, weed technology and pesticide residue analysis. In addition, the project will assist in project planning in crop protection as related to AID country projects and will conduct train-the-trainer programs in pesticide safety. Also, the project will assist in planning and will backstop a local currency research project and prepare a number of environmental assessments for clearance of pesticides in country projects. The project also has been very active in the current African grasshopper/locust emergency and has provided substantial technical assistance in pest management related activities.

2. Aid to U.S. Agriculture:

Involvement of U.S. crop protection scientists in the project will allow them to observe, first hand, how crop pests are controlled in both the semi-arid rainfed zone and in the hot humid tropics. Both of these conditions in a sense represent the extreme of U.S. agriculture and therefore provide valuable insights in terms of effectiveness of pest management procedures under extreme conditions of variation. Also, many pests which are indigenous in the LDC's are not present in the U.S.

However, if accidentally introduced they can wreak havoc. Better knowledge of foreign pests materially assists in early recognition of accidentally introduced pests thereby allowing for the development of effective control/eradication techniques before the pest reaches epidemic proportions.

G. OUTPUTS IMMEDIATELY AVAILABLE

Conducted Seminar/Workshop on Pest and Pesticide Management. Bangkok, Thailand in collaboration with GTZ, FAO, IRDC and IRRI.

Environmental Assessments for Bont Tick program (Carribean); Mediteranean Fruit Fly Eradication (Central America); and Desert Locust (Africa).

Provided technical backstopping for locust/grasshopper control program in Africa.

Conducted Pesticide Disposal Studies (East Africa, South Pacific and Asia).

Training courses in pesticide safe use, weed control, pesticide residue analysis, crop loss assessment, integrated pest management, and microcomputer in pest management.

H. CONTACTS FOR SUPPORT

Project Manager  
Mr. Carroll W. Collier  
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Project Director  
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University of Maryland, c/o CIGP  
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College Park, MD 20740  
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IMPROVED SEED PRODUCTION AND UTILIZATION

Project No: 936-4143

PACD: 7/15/91

A. PURPOSE

To improve capabilities in LDCs for the efficient production, conditioning, distribution and utilization of seeds of improved food and feed crop varieties.

B. SERVICES AVAILABLE

USAID Missions can access the following services:

- 1) Applied research program to solve seed supply problems in LDCs.
- 2) T.A. to missions for:
  - a) planning, organization and implementation of seed production and supply projects/programs in LDCs;
  - b) identification, analysis, and recommendations for resolution of technical and operational problems in seed production, conditioning, testing, storage, and marketing;
  - c) layout designs and technical specifications for seed facilities and equipment including assistance with installation, operational checks, and management aspects;
3. Training:
  - a) Annual 9-week Seed Improvement Course
  - b) Graduate training to B.S., M.S. and Ph.D. degree
  - c) Special non-degree training from one to six months
  - d) In-country and regional training courses from 2-3 weeks upon request
4. Contracting Arrangements:
  - a) For assignments estimated to less than \$25,000 mission can issue Purchase Orders directly to MSU Office of International Programs, P.O. Box 6342, Mississippi State, MS 39762. Competitive bidding is not required.
  - b) For assignments estimated at be more than U.S. \$25,000, missions should make requests to Frank Mertens, S&T/AGR by PIO/T under the Basic Ordering Agreement No. DAN-4143-B-00-7001-00. Expert personnel salary ranges from 200 to 260 US dollars per day plus overhead cost of 17.5% in-country of 43.4% on the MSU campus..

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins.</u>
LOP TOTAL	\$3,420,000	\$1,347,000
Obligation thru FY 86:	2,073,000	0
FY 87 OYB:	130,000	0
FY 88 anticipated (available)	255,000	0

#### D. COMPONENTS/ACTIVITIES

Research: 40% Technical Assistance: (Available through Basic Ordering Agreement) Training: 25% Other: 35%

1. Preparation of project identification documents and project papers.
2. Evaluation of seed programs and recommendations for improvement.
3. Design and specification of facilities and equipment needed for a seed program.
4. Regional, in-country, in-service, and on-the-job training.
5. Degree (B.S., M.S., Ph.D.) and special training programs at MSU with specialization in seed technology.
6. Informational (technical/management) services.
7. Analysis and resolution of technical problems in seed production, conditioning and storage.
8. Review and evaluation of seed projects or the seed components of larger projects.
9. Consulting in privatization and agri-business management.
10. Review and make recommendations on government and private sector policies for the effective operation of seed programs, including items such as: pricing, seed marketing, quality control, certification and seed legislation.

#### E. PROJECT ACCOMPLISHMENTS

The project was initiated in March 1958, under project 931-0203. Last extension in July, 1986 with a new project and cooperative agreement for the period 9/86-7/91. The U.S. subgrantee institution is the Seed and Technology Laboratory (STL) of Mississippi State University (MSU).

The accomplishments are as follows:

1. Training: 253 students from 57 countries have earned degrees in Agronomy-Seed Technology and Management (33, B.S.; 175 M.S.; 45 Ph.D.). 61 participants have received special, non-degree training for 4 to 9 months.

461 participants from 71 countries have completed the annual 9/10 week "Seed Improvement Course" (OICD/TC-130-3) held at MSU. Most of the key positions in the seed program/industry of LDCs are occupied by MSU-trained persons.

2. Technical Assistance: 265 short-term technical assistance consultations have been made to 55 countries. MSU has been substantially involved in seed program/industry development activities in Brazil, Burma, Cameroon, Chile, CIAT (for seed unit), Colombia, Costa Rica, Dominican Republic, Ecuador, Ghana, Guinea Bissau, Guyana, Honduras, India, Indonesia, Morocco, Nepal, Niger, Nigeria, Panama, Paraguay, the Philippines, Taiwan and Thailand.

3. Technology Transfer and Information Services: MSU has been the major medium for technology transfer in seed technology from the developed to the developing countries and the main source of technical information since the mid-1950's. For example, MSU developed a low-cost reusable kit (value U.S. 15¢) for farmers to determine the moisture content of seeds for storage. This kit will be introduced into several LDCs.
4. Allied Activities: MSU has provided the technical assistance and management for three of USAID's most successful seed projects: Brazil (1964-76); India (1968-71); Thailand (1978-87).

F. FUTURE ACTIVITIES/PLANS

- 1) Various research projects to improve the seed technology and industry under tropical conditions.
- 2) Various long- and short-term training programs.
- 3) Appropriate technology will be transferred to and disseminated in LDCs.
- 4) Handbook on Seed Processing and Handling will be revised.
- 5) Handbook on Seed Drying and Storage will be prepared.
- 6) Handbook on Quality Assurance and Central Methods in Seed Enterprises will be prepared on comprehensive systems for private and public operation.
- 7) Semi-annual research and development reports will be distributed.
- 8) Guidelines for maintenance of seed varieties, field inspections and breeder foundation seed production will be published.

G. OUTPUTS AVAILABLE

- a) Handbook on Seed Processing and Handling
- b) Workshops and Conferences
- c) Semi-annual research and development reports

H. CONTACTS FOR SUPPORT

Project Manager

Frank Mertens  
S&T/AGR, A.I.D./W  
Room 411, SA-18  
Washington, D.C. 20523  
Phone: 703-235-1497

Project Director

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Mississippi State Univ.  
P.O. Box 5267  
Mississippi State, MS 39762  
Phone: 601-325-2391

POSTHARVEST GRAIN SYSTEMS RESEARCH & DEVELOPMENT

Project No: 936-4144

PACD: 2/15/91

A. PURPOSE

To improve the capability of LDCs to reduce post harvest cereal and legume losses.

B. SERVICES AVAILABLE

USAID Missions can access the following services:

1. Technical Assistance: The project provides problem-solving technical assistance in postharvest grain systems to missions. This assistance is directed towards solving problems which have been identified by the developing countries and the USAID missions. These efforts address the areas of feasibility studies, marketing studies, policy actions, equipment requirements and design, grain reserves, improvements of grain storage and handling facilities, and improvement of grain preservation.
2. Training: a) annual 7-week course in the storage and marketing of cereal grains and legumes in LDCs. b) on-campus academic training for degrees in fields related to postharvest storage, handling and marketing practices, c) special on-campus and in-country short courses.
3. Research to address problems in postharvest grain systems and to develop appropriate technologies.

Services desired may be obtained by:

1. For assignments estimated to be less than U.S. \$25,000 mission may issue Purchase Orders directly to KSU Department of Grain Science and Industry, Shellenberger Hall, Manhattan, KS 66506. Competitive bidding is not required.
2. For assignments of more than U.S. \$25,000 agencies may make request through Frank Mertens S&T/AGR by PIO/T for desired services through the Basic Ordering Agreement DAN-4143-B-00-7001-00. Expert personnel salary ranges from 200-266 US dollars per day plus overhead cost of 38.5%.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$3,245,000	\$2,400,000
Obligation thru FY 86:	600,000	0
FY 87 OYB:	370,000	0
FY 88 anticipated (available):	425,000	0

D. COMPONENTS/ACTIVITIES

1. Technology transfers including technical assistance.
2. Training
3. Research
4. Networking Activities
5. Technical Assistance through the Basic Ordering Agreement

E. PROJECT ACCOMPLISHMENT

Since July 1967, the Food and Feed Grain Institute (FFGI) at Kansas State University (KSU) has had a continuing agreement with the Bureau of Science and Technology to provide assistance with postharvest grain systems involving grain storage, processing, marketing, and agribusiness development. This assistance has been available to developing countries worldwide.

The main accomplishments of this project are:

1. Technology Transfer

Technology transfer including technical assistance requests, reports and other publications prepared based on these assistance requests and other subjects of interest, and the Postharvest Documentation Services. Staff member consultants have responded to 177 requests for technical assistance, including pre- and post- feasibility studies from 59 countries.

2. Training

The Grain Storage and Marketing Short Course has been held annually on the KSU campus since 1970. This intensive training in grain storage, processing, and marketing has been provided to 411 participants from 73 countries.

Other on-campus training programs are program evaluation, planning, implementation, management, computerized methods of feasibility analysis, systematic procedures for effective project formulation and evaluation, grain handling, conditioning and storage management and a workshop on the larger grain borer has been performed.

Funding for on-campus academic training has been provided in grain storage technology for 38 students from 14 overseas countries (24 M.S., 14 Ph.D), and in grain marketing economics for 10 students from 5 overseas countries (3 M.S., 7 Ph.D.).

In-country training programs are designed to solve specific problems in grain storage, handling, and marketing through instruction of operational personnel and through the training of trainers. Training manuals are developed for each course in order to address the specific areas to be covered by the program. In-country training by FFGI staff has been provided to 969 participants in 20 countries.

### 3. Research

Based on problems encountered during assistance efforts in developing countries, research projects have been developed to provide information not presently available for use in responding to these problems in postharvest grain systems. The overall objectives of the research activities have been to apply solutions to problems existing in developing countries, assist developing country institutions in improving human resources and research technologies, and provide applied training for developing-country researchers. Projects are carried out by staff members and graduate students whose work may or may not be funded by the cooperative agreement.

#### F. FUTURE ACTIVITIES/PLANS

Continuation of the activities described in Project Accomplishments (Section E).

#### G. OUTPUTS AVAILABLE

Results of FFGI activities are published in the form of technical assistance reports, research reports, and special reports. A total of 104 technical assistance reports, 20 research reports, and 12 special reports on subjects of broad general interest are available.

#### H. CONTACTS FOR SUPPORT

Project Manager

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SA-18, Rm 411  
Wash., D.C. 20523  
Phone (703)-235-1497

Project Director

Dr. Roe Borsdorf  
Shellenberger Hall  
Dept. of Grain Science and Industry  
Manhattan, KS 66506  
Phone (913)-532-6161

CROP NEMATODE RESEARCH AND CONTROL

Project No: 936-4149

PACD: 09/15/87

A. PURPOSE

Conduct research on nematodes of economic importance on crop plants in developing countries; provide technical assistance, conduct training and serve as a research network coordinator.

B. SERVICES AVAILABLE

A Buy-in for this purpose provides services to interested missions and host country government.

C. <u>FUNDING</u>	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$1,000,000	\$30,000
Obligation thru FY 86	666,667	0
FY 87 OYB	333,333	0
FY 88 anticipated (available)	0	0

D. COMPONENTS/ACTIVITIES

Research 65%; Technical Assistance 10%; Training 5%; Technical Newsletter 20%.

E. PROJECT ACCOMPLISHMENTS

The project was initiated in September 1984 with headquarters at North Carolina State University. The project's main accomplishments to date are:

1. To Screen crop germplasm for resistance to nematodes.
2. To identify nematode problems involving important crops.
3. To evaluate cropping systems involving important crops.
4. To develop a research network of LDC collaborators.

F. FUTURE ACTIVITIES/PLANS

Continuation of activities described in project accomplishments.

G. OUTPUTS IMMEDIATELY AVAILABLE

Directory of International Network of Scientists engaged in nematology research

H. CONTACTS FOR SUPPORT

Project Manager

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ST/AGR/AP, A.I.D.  
SA-18, Rm 411  
Wash., D.C. 20523  
Phone (703) 235-1497

Project Director

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North Carolina State University  
Dept Plant Path. Bx 7616  
Raleigh, NC 27695-7616  
Phone (919) 737-2721

VERTEBRATE PEST MANAGEMENT

Project No: 936-4173

PACD: 12/31/90

A. PURPOSE

The overall objective of this project is to increase the available food supply in developing countries by reducing losses to vertebrate pests in both preharvest and postharvest situations. The ultimate aim of the pest management research program is to develop safe, effective, and economical control methods which are suitable and practical for traditional farmers and acceptable in the broader context of agricultural development.

B. SERVICES AVAILABLE

USAID Missions can access the specialized services through bilateral arrangements with the implementing institution. Services include:

- Technical assistance with rodent and bird control problems.
- Training courses in vertebrate pest control at the Denver Wildlife Research Center.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$3,910,000	0
Obligation thru FY 86		
FY 87 OYB	\$300,000	0
FY 88 (available)	\$125,000	0

D. COMPONENTS/ACTIVITIES

Technical Assistance, Training, Research and Networking. Self-sustaining, in-country programs are the expected end result of this project. Program goals will be accomplished by: 1) in-country programs, 2) outreach activities from the DWRC as requested by USAID/Washington, USAID Missions, or host countries, 3) supervisory and administrative functions from DWRC and USAID/Washington, and 4) problem-oriented research activities at DWRC.

E. PROJECT ACCOMPLISHMENTS

This project is a revision of an earlier project (#936-4120) that was initiated in FY 83. The rescoped project has the objective of developing, further adaption, and improving vertebrate pest management systems. Vertebrate damage problems in Africa, Asia, and Latin America are continuously reviewed with the aim of adapting current techniques or materials to specific problem situations in a crop protection-oriented management program which will provide an effective means of long-term crop protection. To do this the project must develop safe and effective control techniques and strategies for alleviating problems of significance caused by birds and nonpredatory mammals. These problems include damage to agricultural crops, range lands, forest, livestock feeds, and residential facilities; hazards to human health and safety; and depredations on plant and wildlife resources.

F. FUTURE ACTIVITIES/PLANS

- Conduct research in Africa on appropriate methods for rodent control and assess any negative environmental impact.

Conduct pest surveys to determine relative importance of vertebrate pests within the context of integrated pest management programs.

G. OUTPUTS IMMEDIATELY AVAILABLE

None at this stage of the project

H. CONTACTS FOR SUPPORT

Project Manager

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IMPROVED ANIMAL VACCINES THRU BIOTECHNOLOGY

Project No: 936-4178

PACD: 08/31/89

A. PURPOSE

To transfer the immunizing antigens of the rinderpest virus (prevalent throughout Asia and Africa) to the vaccinia virus to have a vaccine which, because it requires no refrigeration nor costly equipment for its administration, is better suited to Third World conditions than the existing vaccine which has not been adequate for the eradication of rinderpest.

B. SERVICES AVAILABLE

None at this stage.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	5,870,000	-0-
Obligation thru FY 86	870,000	
FY 87 OYB	350,000	
FY 88 anticipated (available)	480,000	

D. COMPONENTS/ACTIVITIES

Research 70%; Technical Assistance 10%; Training 18%; Other 2%

E. PROJECT ACCOMPLISHMENTS

The project was initiated in September 1986. Under the Management of the University of California/Davis and with Kenya as the LDC linkages.

No truly adequate vaccines against these rinderpest exist. Recent data shows, that production losses due to the carrier state of this disease (which occurs throughout the world, including anaplasmosis in the United States) costs more that does the acute disease. The latest biotechnological research on this disease indicates that it is feasible to seek improved vaccines, using the stable vaccinia virus as the carrier of the hemoparasite antigens, to eliminate the carrier state or to, perhaps, provide a basis for eradication of these diseases. As a second task to support present efforts to develop diagnostic techniques for and a vaccine against (there is no adequate vaccine at present) heartwater disease which has been translocated from its origin in Africa to the Caribbean Islands where it poses a threat to the livestock industry of the American Mainland.

F. FUTURE ACTIVITIES/PLANS

A Request for Application for this grant will be issued and the project will be funded in FY 87. The development of this project is dependent upon the availability of funds.

G. OUTPUTS IMMEDIATELY AVAILABLE

None at this stage.

H. CONTACTS FOR SUPPORT

Project Manager

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Project Director

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University of California/Davis  
Office of Research, 275 Mark Ave  
Davis, CA 95616  
Phone (916) 752-1400

Project No: 931 1328

PACD: 9/30/90

A. PURPOSE

To increase production of meat, milk and fiber from sheep and goats owned by small holders in LDCs.

B. SERVICES AVAILABLE

USAID Missions can assess services of researchers through bilateral arrangements with the University of California.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$38,900,000	0
Obligation thru FY 86	29,400,000	0
FY 87 OYB	1,980,000	0
FY 88 anticipated (available)	2,800,000	0

D. COMPONENTS/ACTIVITIES

Research 75%; Training 24%; Other 1%.

The project overseas a multi-disciplinary program to investigate the biological and socio-economic elements of the agricultural production systems in the regions where it is working. Linkages have been established between U.S. and LDC institutions in research programs involving nutrition, range management, animal health, sociology, economics, physiology, and systems analysis.

E. PROJECT ACCOMPLISHMENTS

The Small Ruminants CRSP, conceived as an 11-year effort, was initiated in 1978 under a collaborative agreement in which the University of California at Davis was the implementing organization with 8 other universities (U. of Missouri, Utah State Texas Tech., Texas A&M, Colorado State, Montana State, Washington State, and North Carolina State) and Winrock International as subgranted institutions. The project overseas a multidisciplinary program to investigate the biological and socio-economic elements of the agricultural production in 5 countries: Brazil, Peru, Indonesia, Kenya and Morocco. Linkages have been established with more than one national agency within each country. Linkages have been established between US and LDC institutions in research programs involving nutrition, range management, animal health, sociology, economics, physiology, and systems analysis.

Integration of subject specialists, institutions and individual scientists is progressing rapidly and numerous project reports have been published. Complete production packages are now being formulated from the results of research in different ecological zones and in two systems of small ruminant production.

#### Highlights and Accomplishments to Date:

- The development of a rapid diagnostic test and new vaccine for contagious caprine pleuropneumonia in Kenya is of economic importance to Africa and Asia.
- The upgrading of Criolla sheep with a locally developed breed in Peru is expected to increase carcass meat production by 8,000 MT and grease wool by 200 million Kg per year.
- The development of a Selenium and Vitamin E treatment for lambs in Morocco has eliminated a severe white muscle disease problem which could save at least 1 million head of lambs per year.
- The development and introduction of dual-purpose goats to 150 farms in Kenya where no livestock were formerly maintained.
- The tripling of fiber yields from alpacas in Peru add \$40-\$50 U.S. annual income per animal.
- The inclusion of green legumes foliage in livestock rations in Indonesia has increased weight gains 120% and feed efficiency by 80% and could be applied to over 1 million sheep and goats there.
- The development of an accurate diagnostic test and control for two sheep diseases pulmonary adenomatosis (SPA) in Peru and progressive pneumonia, an important respiratory disease of sheep throughout the world.

#### F. FUTURE ACTIVITIES/PLANS

Four major activities are to be continued in the future:

1. Planning for national research programs with host country scientists
2. Establishing linkages among host country agencies in order to focus on common objectives
3. Developing laboratory facilities
4. Providing direction for host country research programs

#### G. OUTPUTS IMMEDIATELY AVAILABLE

- Annual reports on accomplishments and budgets
- Annual Evaluation Report by the Independent Committee
- Annual Work Plans for 15 Research Subprojects
- 5 Year Summary of Accomplishments
- Listing of Research Publications (1978-83)
- Technical Reports (44 to date)
- Genetics of Reproduction in Sheep, a reference book on prolific sheep with contributions from 50 scientists in 17 countries.
- Quarterly Newsletter
- Program Information Brochure

#### H. CONTACTS FOR SUPPORT

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Project Director  
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Small Ruminants/CRSP  
University of California  
Davis, CA 95616  
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HOST RESISTANCE/INTEGRATED TICK CONTROL

Project No: 936 4083

PACD: 8/31/88

A. PURPOSE

To attack tick-borne diseases such as Heartwater and Babesioses in livestock. To find and multiply tick resistant strains of livestock and to develop vaccines against ticks.

B. SERVICES AVAILABLE

USAID Missions can access the services of researchers through bilateral arrangements with the implementing institution.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL:	\$1,450,000	0
Obligation thru FY 86:	930,000	0
FY 87 OYB	260,000	0
FY 88 anticipated (available):	260,000	0

D. COMPONENTS/ACTIVITIES

Research 85%; Technical Assistance 5%; Training 10%

The research component is committed to the development of:

1. vaccines which protect livestock against ticks
2. improved measures for the control of ticks in the environment
3. lines of livestock breeds having high natural resistance to ticks

E. PROJECT ACCOMPLISHMENTS

Initiated in September of 1983 with The International Centre for Insect Physiology and Ecology with LDC linkages with Kenya and other collaborating African states. The following accomplishments have been realized:

1. The investigators conducting this research have identified and isolated the antigens produced by ticks which are effective as a vaccine in producing immunity (resistance) in livestock to ticks. This occurs through the production of antibodies in the animal's blood which attack the tick's digestive system when it attempts to attach to and feed from the animal.

2. Breeds, and lines within breeds, of African cattle have been identified which show a high degree of natural resistance to tick infestation. These animals are being characterized genetically and their numbers increased through selective breeding. Defining the genetic component of this resistance would pave the way for identifying livestock around the world that have this capability.

3. Basic research on tick ecology has provided new bases for controlling ticks in the environment through the use of specific attractants.

F. FUTURE ACTIVITIES/PLANS

Investigations into the development of resistant cattle and proper treatment of ticks will continue.

G. CONTACTS FOR SUPPORT

Project Manager

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Project Director

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III. DIVISION OF RENEWABLE NATURAL RESOURCES

INTERNATIONAL FERTILIZER DEVELOPMENT (IFD)

Project No: 931-0054

PACD: 06/30/90

A. PURPOSE

To assure a dependable supply of better fertilizers at lower cost to farmers in the developing countries.

B. SERVICES AVAILABLE

USAID Missions can access specialized services for technical questions and training through bilateral agreements with the International Fertilizer Development Center.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL through FY 86	\$64,700,000	0
Obligation thru FY 86	50,000,000	0
FY 87 OYB	3,460,000	0
FY 88 anticipated (available)		0

D. COMPONENTS/ACTIVITIES

Research 30%; Technical Assistance 30%; Training 30%; Other 10%.

The specific project activities are:

1. Research:

- a) Research on fertilizer needs and use.
- b) Process development.
- c) Estimation and forecasting of LDC country fertilizer needs.
- d) Evaluation of phosphate needs in LDCs.

2. Technical Assistance:

- a) Investment feasibility studies.
- b) Management consultation.
- c) Project design assistance.

3. Training:

- a) Field research, production, process control, promotion and extension.

4. Other:

- a) Collective, collation and distribution of information, related to fertilizer.

E. PROJECT ACCOMPLISHMENTS

1. IFD is a project implemented by the International Fertilizer Development Center (IFDC) and was started in 1975. A.I.D. has authorized government funding through 1990. Total funding has exceeded \$50 million through FY 86. Although the annual contribution is programmed at \$4 million, the FY 87 OYB is \$3.46 million. Funds from other sources, mostly in the form of restricted grants and contracts will raise the IFDC budget to approximately \$10 million.

2. IFDC has programs in fifty countries. The S&T grant is used in support of basic research and early technical development work which will be applicable in number a of countries, perhaps universally.

3. IFDC has active collaborative programs with CIAT, ICRISAT, IITA, IRRI and IFPRI. Notable coordination efforts are cooperation with IRRI in FERRAT, the rice fertilizer research network in South Asia, the West African Fertilizer Research Network with 17 countries and East African Fertilizer Research Network. The networks are used to evaluate experimental fertilizers, to test potential ways to use fertilizers more effectively, to define areas where fertilizers do not produce reasonably expected results and pinpoint locations which require additional soil management research.

4. Training is another important activity. Three hundred individuals are trained each year in a wide range specialities such as feasibility of fertilizer production, fertilizer, raw material evaluation, retail sales and promotion of fertilizer use.

F. FUTURE ACTIVITIES/PLANS

1. In addition to the headquarters laboratory a continue research in fertilizer production, use and marketing.

2. Build a new research and training center in Togo, West Africa.

G. OUTPUTS IMMEDIATELY AVAILABLE

1. Feasibility studies, and research evaluation and reports

2. Process recommendation,

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BIOTECHNOLOGY-LIMITING FACTORS

Project No: 931-0610

PACD: 05/31/89

**A. PURPOSE**

To develop practical ways to enable crops to capture nitrogen from the air by collaborative (equal-partner) research between LDC and US scientists on factors limiting biological nitrogen fixation in LDCs.

**B. SERVICES AVAILABLE**

USAID Missions can access specialized services, through bilateral arrangements with the implementing institutions. The project can arrange technical workshops and assistance by U.S. scientists in LDC cooperating countries.

**C. FUNDING**

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$7,000,000	0
Obligation thru FY 86	5,570,000	0
FY 87 OYB	250,000	0
FY 88 anticipated (available)	250,000	0

**D. COMPONENTS/ACTIVITIES**

Research 50%; Technical Assistance 20%; Training 30%.

**E. PROJECT ACCOMPLISHMENTS**

1. Implemented in 1976, the Biotechnology Limiting Factors project funding has been \$5.57 million. This funding has gone toward 82 grants for cooperative research involving scientists worldwide averaging about \$70,000 for each three-year grant. At this time, 22 projects are active involving 30 scientists in 19 LDCs.

2. Biological nitrogen fixation (BNF) is being developed to provide an alternative to an increased use of expensive fertilizer nitrogen. Research involved 10 grain legumes, 5 forage legumes and 3 tree legumes and their rhizobia partners. A new inoculant formulation may provide high temperature tolerance. New varieties of beans have been developed that can fix two to four times as much nitrogen as the commercially used parents. Rhizobia and legumes tolerant of acid soils, resistant to aluminum toxicity, and salt tolerant have been identified.

3. Forty-seven (47) graduate students have been supported involving 21 developing countries: 4 from Africa, 9 from ANE, 8 from LAC. More than 72 journal articles have been published. 38 persons have earned the MS/PhD degree through this project.

F. FUTURE ACTIVITIES/PLANS

Continue cooperative research to develop legumes, rhizobia and inoculants that will make available inexpensive nitrogen to LDC farmers.

G. OUTPUTS IMMEDIATELY AVAILABLE

1. Biological Nitrogen Fixation for Tropical Agriculture, a 762 page book published by CIAT.

2. Proceedings: Coordinating Workshop BNF Limiting Factors Program, published by NIFTAL, University of Hawaii.

3. More than 70 technical publications from scientific journals

4. Annual Reports.

5. Missions can buy-in to support research in their country by "equal partnership" with a U.S. investigator.

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SOIL MANAGEMENT SUPPORT SERVICES (SMSS)

Project No: 931-1229

PACD: 9/29/89

A. PURPOSE

To develop the prerequisites for soil resource inventories and assessments, land use evaluation, soil conservation/management for environmental integrity and improved agricultural sustainability, and improved soil-based agrotechnology transfer.

B. SERVICES AVAILABLE

A buy-in to this project provides specialized services to interested missions and host country governments.

<u>C. FUNDING</u>	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$8,832,000	\$500,000
Obligation thru FY 86	6,967,000	300,000
FY 87 OYB	615,000	300,000
FY 88 anticipated (available)	660,000	300,000

D. COMPONENTS/ACTIVITIES

Research 10%; Technical Assistance 30%; Training 30%; Information dissemination 30%.

E. PROJECT ACCOMPLISHMENTS

SMSS was initiated in 1979, through a PASA with OIGD, to assist developing countries to build their capacity for addressing soil resource problems. The Soil Conservation Service (SCS) of the USDA implements the project.

The main accomplishments of the project to date are:

1. Research: Eight international committees, with more than 500 soil scientists from over 45 countries, have improved the usefulness of Soil Taxonomy -- the US system of soil classification -- and it is now the international system of soil classification. Through technical workshops conducted in 12 countries, the system is used for soil-based agrotechnology transfer. To facilitate the use of the system, cheap and efficient methods of soil analysis have also been developed.
2. Technical Assistance: Assistance has been provided to more than 50 countries with more than 3,500 person-days in over 250 TDYs. Assistance has been in areas of land evaluation, soil surveys, institutional strengthening, laboratory capability, and database management.
3. Training: More than 900 developing country scientists from 80 countries have been trained at national or regional courses conducted in 17 countries in the areas of soil analysis, soil survey methodology, soil classification, and soil management.

## F. FUTURE ACTIVITIES/PLANS

In its seven years of operation, the project has built up an informal network of institutions and scientists involved in soil resources. Future activities will build on this base but giving more emphasis on utilization.

1. Research: Computer assisted techniques will be tested for geographic information systems, processing and analysis of soils information, utilization of portable microcomputers for field soil surveys and methodology for land evaluation; this will be done in collaboration with SCS and US Universities.
2. Technical assistance: The current modus operandi -- based on requests from USAID/Missions and developing country institutions -- will be continued. In addition, special TDYs will be targeted in support of item 1 and/or special problems/concerns identified by project for selected countries.
3. Training: Current training programs will be continued as there is still a need. In addition, special programs will be developed for soil management, systems approach to soil use and computer techniques to assist resource inventory programs.
4. Information dissemination: New efforts will be directed to conservation and management of soil resources. The project will continue to serve as repository for world soil information and make this information available to all users.

## G. OUTPUTS IMMEDIATELY AVAILABLE

1. Technical publications; over 70.
2. Newsletter "Agrotechnology Transfer."
3. Computer software.
4. Audio visual training materials.
5. Database on world soils.
6. A soil classification system designed for use in the tropics.
7. Information on management of major soils.
8. Database on soil moisture and temperature regimes of developing countries.

### Key Publications:

- Keys to Soil Taxonomy ( in five languages )
- Soil moisture regimes ( all developing countries )
- Bibliography of Soils of the Tropics ( five volumes )
- Proceedings of workshops ( 25 in total )
- Benchmark soils of... ( selected countries )
- Guidelines for .....( techniques in soil surveys )

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Project No: 931-1311

PACD: 9/25/89

**A. PURPOSE**

Basic purpose of sponsored research is to increase farm productivity through better soil management which both conserves and protects the soil.

**B. SERVICES AVAILABLE**

When an A.I.D. Mission or Host Country identifies a farming area where research for increasing crop production with minimum capital resources is desired, S&T/ACR in cooperation with scientists at North Carolina State, can provide expert guidance.

Starting with a computerized selection of soil management practices--based on readily measured soil characteristics this "Low Input Soil Management System" utilizes selected crop varieties, crop rotation instead of extensive weed killer application, and requires only minimal inputs of lime and fertilizer. The system has so far been developed in the humid tropics of Peru, Indonesia and the Brazilian Amazon, in the semi-arid tropics of Niger and Mali and in the acid savannahs of Brazil.

<b>C. <u>FUNDING</u></b>	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$27,500,000	\$45,000
Obligation thru FY 86	24,700,000	45,000
FY 87 OYB	2,185,000	0
FY 88 anticipated (available)	2,700,000	0

**D. COMPONENTS/ACTIVITIES**

Research 100%; Technical Assistance 0%; Training 0%.

Activities incidental to research include: TDY assistance to missions, LDC based training workshops and degree training in-country and also in the U.S.

**E. PROJECT ACCOMPLISHMENTS**

1. Funding began in 1981 with project emphasis on the tropical soils of Africa, Latin America/Caribbean, and Asia.
2. Work from earlier projects has shown yields can be sustained for 25 crops over a ten year cycle. Aluminum toxicity is being reduced by incorporating lime, phosphate and organic residues into the soil.
3. "Africano Desconido," the "Unknown African" rice variety was found to thrive in the acidic soil conditions of the Amazon region. This variety has increased yields by three times and has made it possible in rotation with cowpeas to develop a cropping system utilizing minimum inputs while maintaining high yields.

4. Legume based pastures offer an attractive alternative to cultivated crops and a way to increase farm productivity without a large increase in labor requirements.
5. Several agro-forestry systems are demonstrated alternatives or complements to field crop production.
6. Except in instances of severe erosion, techniques have been recognized or devised to rehabilitate land damaged by improper clearing.

F. FUTURE ACTIVITIES/PLANS

Additional crops and varieties are being screened for acid, aluminum and/or manganese tolerance to minimize the need for soil amendments. Systems to adjust practice to soil microvariability are being sought. A greater range of alternative crop combinations will be tried to provide systems appropriate for many more social and economic environments. Careful soil status and nutrient removal logging will be continued to document both depletion and accumulation of plant nutrients. The latter being especially important with phosphorus and micronutrients.

G. OUTPUTS IMMEDIATELY AVAILABLE

1. Sustainable high level management systems for ultisols and alfisols in the humid tropics.
2. Legume based pasture systems for the humid tropics.
3. Legumes for the wet and dry tropics catalog.
4. Computerized land capability system for rapid land practice estimation.
5. Various research and training papers.

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TECHNOLOGY FOR SOIL MOISTURE MANAGEMENT (TSMH)

Project No: 936-4021

PACD: 9/29/88

A. PURPOSE

To identify technically sound and economically feasible soil and water technologies for crop/livestock systems under rainfed conditions, and to assist developing countries to assess rainfed problems and achieve technology transfer through appropriate agricultural projects and resource management/conservation programs.

B. SERVICES AVAILABLE

Technical Assistance for improving dryland rainfed production systems and maintaining the natural resource base.

TSMH is unique because it integrates agronomic research and economic assessments within one project. This integration is derived from the fact that decision makers must understand both agronomic and economic issues in order to assess soil and water management options realistically.

TSMH's basic approach involves: 1) compiling databases or syntheses of relevant in-country research and conduct follow-on workshops to assess findings and establish priorities; 2) organize and conduct regional and international workshops and conferences on dryland systems; and 3) planning and implementing regional agronomic research and economic studies on soil and water management issues. 4) Technical assistance to USAID Missions, host governments and national/international research organizations.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$2,900,000	\$100,000
Obligation thru FY 86	2,485,000	0
FY 87 OYB	400,000	0
FY 88 anticipated (available)	510,000	0

D. COMPONENTS/ACTIVITIES

Research: 25% Technical Assistance: 25%  
 Training: 25% Technology Transfer: 25%

Current Activities to Date take place in the following countries and research organizations:

Asia: Thailand, Sri Lanka, India  
 Africa: Niger, Mali, Sudan, Burkina Faso, Mauritania  
 Near East: Jordan, Morocco, Egypt, Turkey

Research Organizations involved are ICRISAT, ICARDA, IITA, ORSTOM and IRAT

The Technology for Soil Moisture Management Project (TSMM) was initiated in 1983 under a Participating Agency Service Agreement (PASA) with USDA. The Agricultural Research Service (ARS) and the Economic Research Service (ERS) are direct implementers. Through TSMM, the skills of scientists and researchers in ARS, ERS, International Agricultural Research Centers (IARCs), US land-grant universities and other research centers are being applied to arid and semi-arid regions.

#### E. PROJECT ACCOMPLISHMENTS

Highlights and Accomplishments to date include:

In-Country Research Databases Creation of Northeast Thailand and Jordan research databases on soil moisture conservation, conservation tillage, wind and water erosion control practices, farming systems/crop rotations, soil fertility, agroclimatology, socioeconomic impacts and cost/benefit effects of improved management practices, crop residue management, water harvesting and systems modeling. Efforts are now ongoing in Sri Lanka, Mali, Niger and Mauritania, Thailand, and Jordan.

Regional Workshops Held to date in Thailand, Jordan and Niger and have brought together governmental, university and international experts to assess existing research, to establish priorities for future research, and to identify resources to address problems.

Regional Research Five Near East countries are using a common experimental design to study the agronomic and economic values of crop residues from rainfed wheat and barley, for soil and water conservation and for livestock utilization. Four West African countries are studying the use of crop residues for improved soil moisture management, wind/water erosion control, and livestock feed.

Economic Studies A Mali case study has found that increasing the infiltration of rainfall from 40% to 60% can create income benefits 2-4 times current levels. Income can be increased by another 50 percent if the infiltration is raised to 80%. With water conservation benefits of this magnitude farmers should be able to afford reasonably priced technologies.

#### F. FUTURE ACTIVITIES/PLANS

TSMM will continue to synthesize past in-country research experience in soil and water management/conservation for dryland production in order to improve the basis for further research activity. Collaborative research and economic analysis of appropriate soil and water management technologies will be continued and expanded with additional institutions.

#### G. OUTPUTS AVAILABLE

Key Publications:

- World Water for Agriculture: Precipitation Management
- Dryland Soil Resources
- Dependable Precipitation and Potential Yields for Senegal: A Practical
- Guide for Rainfed Agriculture
- A Crop Water Evaluation Manual for India

## Publications in Process

- Technological Change and Agricultural Productivity in Dryland Areas of the Sahel
- Technological change and Agricultural Productivity in Dryland Mali
- Data and Information Needs for Dryland Agricultural Decisions
- Soil and Moisture Management in Mali: A Case Study Analysis for West Africa.

Agroclimatology Advisory Services: A small team of agroclimatologists provide guidance in the following areas: improved collection, stratification, and synthesis of agroclimatic data for agricultural use in collaboration with WMO, FAO, IARCs and U.S scientists.

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INT'L BENCHMARK SITES NETWORK FOR AGROTECHNOLOGY  
TRANSFER (IBSNAT)

Project No: 936-4054

PACD: 8/31/92

**A. PURPOSE**

To expedite transference of information for sustainable agriculture in LDCs that is needed by decision makers at all levels to shepherd the development process intelligently and with confidence. The project computerized programs help make responsible choices that result in desired outcomes.

**B. SERVICES AVAILABLE**

When an A.I.D. Mission or a host country does not know what developmental options are available to them and also cannot wait to develop answers by long-term site-specific research, S&T/AGR in cooperation with the University of Hawaii can provide expert service for an innovative approach to resolve the problem.

A buy-in to this program provides research, training and technical assistance to any host country when requested by and A.I.D. Mission. The services available are:

- Technical assistance to USAIDs and LDCs
- Technical information sharing
- Regional training workshops
- Back-stopping for LDC collaborators

**C. FUNDING**

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL:	\$9,930,000	\$3,000,000
Obligation thru FY 86	4,130,000	0
FY 87 OYB	890,000	0
FY 88 anticipated (available)	1,080,000	0

**D. COMPONENTS/ACTIVITIES**

Research 42%; Technical Assistance 13%; Training 24%; Networking 21%

The central concept of systems-based research is that the whole system must be understood in order to evaluate changes in any single component. In this innovative approach, the project brings together existing knowledge of the farming system, identifies major components and processes and their interactions, and seeks to identify the bottlenecks to improve performance. IBSNAT is intended to provide the structure and mechanism to link soil, water, weather, crop and management research projects into a coherent, problem-solving instrument, called the Decision Support System for Agrotechnology Transfer.

1. Validate simulation models for ten crops
2. Develop operational agronomic data base management system
3. Establish capability in LDCs to use models for predicting crop performance
4. Establish fully functional prototype network

#### E. PROJECT ACCOMPLISHMENTS

The project was carefully designed to attack the more critical factors impeding agricultural development in the tropical and semi-tropical areas of the developing world. Previous A.I.D. supported research has demonstrated that agrotechnology could be successfully transferred on the basis of a comprehensive soil classification system, i.e., "transfer by analogy". For the first time, the components for a successful transfer of agrotechnology existed.

It was recognized, however, that maximum crop yields do not result from the cumulative effect of individual site characteristics and management practices but from the "interaction" between these components. For maximum economic crop production, optimum conditions must exist with respect to at least five variables (1) balances supply of plant nutrients, (2) solar energy, (3) rooting zone with adequate amounts of water and oxygen, (4) crop varieties with the genetic potential to make effective use of environmental and management inputs, and (5) crop protection from insects, diseases, weeds and other hazards. The purpose of this attempt was then conceived as an attempt to bring these components together for a successful transfer of agrotechnology from research centers to farmers fields in a timely and acceptable manner using a systems approach of "transfer by simulation".

Originally conceived to require project activities covering a nine-year span, the project was approved and a contract was executed with the college of Tropical Agriculture and Human Resources of the University of Hawaii in August 1982 for a five year period. Starting September 1987 the project will be in cooperative agreement format for another five years.

The project has developed a unique collaborative world-wide network of both developed and the developing countries to tap, mold and disseminate the rapidly changing technology of systems approach for the purpose of agrotechnology transfer.

#### F. FUTURE ACTIVITIES/PLANS

1. An optional data base management system and data base enlarged to cover prototype DSSAT.
2. Decision-aids (simulation and expert system models) for LDC scientists, extension workers, and farmers developed and validated for agricultural development (strategic) and production (tactical) levels.
3. Computer software for LDC scientists, extension workers and farmers; developed, tested and applied to enable users to interact with DSSAT, i.e., a dialogue generator.
4. The DSSAT expanded to solve additional problems commonly encountered at the farm level as well as application to other commodities and products.
5. a. Functioning and viable network of international, regional, and national research centers and development agencies for continuing DSSAT development and application by targeted beneficiaries.  
b. Conferences and international study groups held on DSSAT.  
c. Publications and scientific journal articles produced selectively collected and disseminated to LDCs and international organizations.

6. a. Application of DSSAT to location specific agricultural problems to end-users.
- b. Acceptance by LDC scientists, extension workers, and farmers.
- c. Documentation of the intercrop model will be published and distributed.
7. a. Training and acceptance of DSSAT by a representative number of collaborators and end-users.
- b. Training natural resource inventory specialists.
- c. Develop manual dealing with experimentation, data sheets instructions for collecting a minimum data set (MDS) for genetic coefficient determination.
- d. Develop and distribute to collaborators data sheets and instruction for collecting a MDS for genetic coefficient determination.

**G. OUTPUTS IMMEDIATELY AVAILABLE**

Publications available from PPC/E/DIU:

- IBSNAT Brochure, IBSNAT Leaflet
- IBSNAT Project Design Elements, Linkages and Schedules
- Agrotechnology Transfer (Newsletter)
- Minimum Data Set of Agrotechnology Transfer - Guide
- Guidelines - Experimental Design and Minimum Data Set
- Networking Knowledge - The Future is Now
- Dr. N.C. Brady's Keynote Speech August '84
- Progress Report 1982-85
- Mid-term Evaluation, 1985
- Project Paper, 1987
- Technical Report - DSSAT
- Software for data entry of minimum data set (4 diskettes)

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Project No: 936-4127

PACD: 09/29/87

**A. PURPOSE**

To increase host country capabilities to plan and implement irrigation water management programs and to change attitudes and behaviors at all levels toward irrigation water management improvement. Major emphasis is irrigation systems; rehabilitation strategies; and new irrigation technologies.

**B. SERVICES AVAILABLE**

A buy-in to this project provides the following services to USAID Missions and host country governments:

1. Technical Assistance to AID Missions and host governments, including project design, monitoring and evaluation, sector surveys, studies and analysis and trouble-shooting on specific irrigation/water management problems.
2. Training Activities, including both in-country and U.S. short courses related to both on-farm and main-systems operations and management, diagnostic analysis workshops, policy and strategy training courses.
3. Technology Transfer and information exchange efforts, including workshops and conferences as well as reports, manuals, handbooks and other publications pertaining to the development/improvement of LDC irrigation.
4. Special Studies into selected problem areas, including both long-term and short-term research efforts; located both in the LDCs as well as on-campus; and either at the request of AID (including Missions and regional bureaus) or those initiated by the universities but approved by AID.

**C. FUNDING**

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$20,000,000	\$6,000,000
Obligation thru FY 86	18,412,892	0
FY 87 OYB	785,000	0
FY 88 anticipated (available)	0	0

**D. COMPONENTS/ACTIVITIES**

Research 20%; Technical Assistance 40%; Training 20%; Technology transfer 20%.

**E. PROJECT ACCOMPLISHMENTS**

WMS II is a five-year, \$20.0 million project that is jointly funded by the Asia/Near East and Africa Bureaus as well as by two S&T Offices -- AGR and RD. It is being implemented by the Consortium for International Development (CID), with the main implementing entities being Utah State

University, Colorado State University and Cornell University. However, resources are also secured from other CID and non-CID universities as well as from consulting firms and other private sources. The project became operational in September 1982 and is due to terminate March 29, 1988.

Besides responding to over 100 mission requests for technical assistance and training during its first three years (FY 1982-85), the Water Management Synthesis II Project has also carried out nearly fifty special studies (action research) and Technology Transfer activities. These have project evaluations, seven diagnostic analysis workshops and numerous trouble-shooting efforts ranging from operation and maintenance to curriculum development. Special studies have focused on several broad socio-technical areas including rehabilitation and existing system improvement, farmer participation and user organizations, small-scale and locally-managed systems development, main system management, on-farm and command area development, and water pricing and policy. Over fifty publications have been produced, as well as three major videotape sets (training), including one with forty separate modules in both Spanish and English.

While the initial focus has been on Asia, increased attention is now being given to the other regions. Africa has been receiving increased emphasis during the project's last two years, with three "Joint Field Studies" underway (Niger, Rwanda, Zimbabwe) and a major international conference on irrigation improvement in Africa being planned (Nairobi, January, 1988). Mission buy in support, greater than anticipated, is expected to remain high; central support will remain about the same as in previous years--about three million per year, with funding coming from two regional bureaus (ASIA and AFRICA) as well as the Bureau for Science and Technology.

#### F. FUTURE ACTIVITIES/PLANS

While the WMS II Project is winding down, a planned follow-on project (Water Management Research and Support--WMRS: 936-4179) will replace it which will give particular attention to Africa. The scope of the follow-on project will be broader in order to deal more effectively with the development and improvement of irrigated agriculture, as proposed to "irrigation," as well as to deal more substantially with the more non-traditional aspects of water management, e.g., flood recession farming, swamp cultivation, wetlands agriculture, water harvesting/spreading, etc.

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BIOTECHNOLOGY · PLANT TISSUE CULTURE

Project No: 936-4137

PACD: 8/31/39

**A. PURPOSE**

To increase farm income and productivity by using biotechnology plant tissue culture methodology in helping develop crop varieties with ability to escape vagaries of environmental stresses.

**B. SERVICES AVAILABLE**

When an A.I.D. Mission or a host country identifies a farming area where a major environmental stress such as drought or soil salinity exists and they are interested in using the low-cost methodology of crop biotechnology rather than using recurrent high cost inputs e.g., materials for amending soils, providing irrigation etc., S&T/AGR in cooperation with scientists from Colorado State University can provide expert service.

A buy-in to this program provides research, training and technical assistance to any host country when requested by an A.I.D. Mission.

**C. FUNDING**

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$5,000,000	\$500,000
Obligation thru FY 86	-	0
FY 87 OYB	460,000	0
FY 88 anticipated (available)	750,000	0

**D. COMPONENTS/ACTIVITIES**

Research: 65%; Technical Assistance: 10%; Training: 15%; Networking: 10%.

- Research: Long-term tissue culture regeneration and selection for stress tolerance of cultivars of wheat, rice, sorghum, corn, millet, cowpeas and common beans. Stresses researched include: heat, soil salinity and aluminum toxicity, and drought.

- Training: six-month training course that includes general lecture and laboratory instruction as well as specific work with crops and techniques of particular interest to trainees; graduate education leading to advanced degrees available through the project and its collaboration.

- Technical Assistance: short-term technical assistance provided by project personnel or its collaborators on cost reimbursable and in a few cases cost-sharing basis. Assistance is available in the areas of planning, implementation, evaluation and training.

- Networking: an informal network exists to facilitate working partnership among researchers worldwide with mutual interest in using plant biotechnology to accelerate crop improvement methodologies. The network emphasizes information exchange and equal partner research collaboration. Exchange of personnel is encouraged.

#### E. PROJECT ACCOMPLISHMENTS

Hundreds of millions of acres of farm land in the developing countries are affected by various environmental stresses such as soil salinity and aluminum toxicity, drought and high temperature. Most environmental stresses cannot easily be corrected if at all. In search towards a practical solution A.I.D. initialed an exploratory research during 1980 to determine whether crop variety characteristics could be modified to overcome stresses through a tissue culture technology. Millions of cells are screened under a given stress to locate desirable mutants. Promising cells could then be regenerated into whole plants for crop improvement purposes. The preliminary studies were encouraging. As a result a more comprehensive program was started during August 1984. A five year cooperative agreement was signed with Colorado State University. Studies are being conducted on half a dozen crops important to the LDC farmers and for four environmental stresses mentioned above. Stress tolerant crop lines are being tested in the greenhouse and field in cooperation with national and international crop research centers. Promising lines and methodology will be made available to plant breeders.

#### F. FUTURE ACTIVITIES/PLANS

1. Obtain high-frequency long-term plant regeneration of plants under study.
2. Develop techniques for selecting tissue cultures and regenerated plants tolerant to heat, salt, drought and aluminum toxicity.
3. Develop techniques for using tissue cultures to promote gene introgression in wide crosses of wheat and for corn.
4. Develop techniques for selecting tissue cultures and regenerated plants more efficient at utilizing nitrate and phosphate.
5. Develop techniques for obtaining high-frequency plant regeneration from selected cereals and legume cell suspensions and protoplasts.
6. Verify stress-tolerance selection techniques through green house and field testing of whole plants.

#### G. OUTPUTS IMMEDIATELY AVAILABLE

1. Progress report through 1987; 2. Training guide and packages; 3. Laboratory techniques; 4. Reference material and information; 5. Newsletter; 6. Pamphlet

#### H. CONTACTS FOR SUPPORT

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IMPROVED BNF THRU BIOTECHNOLOGY

Project No: 936-4177

PADC: 09/30/95

A. PURPOSE:

To use the natural resources of legumes and nitrogen - fixing microbes to promote sustainable agriculture in LDCs; to train LDC agriculturalists to adapt, use and disseminate information about biological nitrogen fixation (BNF); and to increase their capacity to produce and distribute BNF inocula.

B. SERVICES AVAILABLE:

A buy-in to this project provides the following services to interested missions and host country governments through University of Hawaii and regional BNF resource centers:

Training activities: short courses, intern training and graduate training in legume-rhizobia technology, legume production and BNF use, genetic technologies, fate of introduced microbes, and commercial BNF inoculant production and distribution.

Germplasm: selected rhizobia for grain, forage and tree legumes; antisera for identifying specific rhizobia; limited amount of legume tree germplasm.

Technical Assistance: evaluation and assessment of national BNF programs, project identification in natural resource use and project development, project implementation, inoculants for legumes, inoculant production consultation, and research collaboration.

Technology Transfer: Network conference, subgrants for cooperating LDC scientists, BNF Bulletin, literature and information exchange.

C. <u>FUNDING</u>	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	9,690,000	10,300,000
Obligation thru FY 86	200,000	200,000
FY 87 OYB	750,000	
FY 88 anticipated (available)	780,000	10,300,000

D. COMPONENTS/ACTIVITIES:

Research 45%; Technical Assistance 19%; Training 25%; Other 11%.

1. The overall objective of the research component is to improve the BNF technology so LDC farmers can use it to produce crops more efficiently. The specific research objectives are:

(a) Genetic improvement of rhizobia for tropical legumes, (b) improvement of host performance in BNF symbiosis, (c) maintain, characterize and evaluate germplasm resources for BNF systems, (d) developing methodologies for monitoring microorganisms (rhizobia) introduced into the environment,

(e) collection of environmental (field) data for practices to maximize BNF. Techniques used will include recombinant DNA, antigen antibody reactions, cell selection, breeding and statistical modeling.

2. In addition to training and technical assistance to LDC's, the project will provide:

(a) leadership in global, regional and in-country networks of LDC scientists and DC scientists; (b) germplasm resources and antisera for rhizobia.D.

#### E. PROJECT ACCOMPLISHMENTS

The BNF project was initiated in FY 86 as a follow-on project to Fixation, Symbiotic (931-0613). The project strategy is to develop better BNF systems so farmers can increase their income through increased efficiency in crop production by optimizing the use of home-grown nitrogen.

Among its activities: in Haiti, a NIFTAL staff member participated in assessing the inoculant production situation for a tree project using legume and other nitrogen fixing trees. In Zambia, NIFTAL successfully established a rhizobia inoculation production plant, conducted research to show the value of inoculation of legumes, and produced inoculants for the ZAMARE project. In Pakistan, a NIFTAL staff member assessed the national program in biological nitrogen fixation and suggested improvements. In Burma, scientists were trained and equipment recommended to improve inoculant production and use.

#### F. FUTURE ACTIVITIES/PLANS

World-wide - Build and test a model to describe crop response to rhizobia inoculation so farmers can use rhizobia inoculant and legume crops effectively. LDC cooperating scientists in several countries are involved. Provide tested rhizobia germplasm and techniques to national scientists. Provide training for national scientists and an information network. Conduct research to improve BNF usefulness.

#### G. OUTPUTS IMMEDIATELY AVAILABLE:

1. Training guide and packages
2. Teaching manual
3. Outreach handbook in four languages
4. Newsletter
5. Information reference material, pamphlets
6. Rhizobia inoculants
7. Legume seeds.

#### H. CONTACTS FOR SUPPORT:

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G. OUTPUTS IMMEDIATELY AVAILABLE

1. Surveys and studies of AID needs in fisheries development assistance.
2. Project assistance reports.
3. Project and proposal evaluation reports.
4. Country by country Fishery Status files.

H. CONTACTS FOR SUPPORT

Project Manager

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CRSP-AQUACULTURE POND DYNAMICS

Project No: 936-4023

PACD: 8/31/90

A. PURPOSE

To define the principles underlying sound aquaculture management and improve practices so as to provide increased employment and a dependable, inexpensive source of animal protein.

B. SERVICES AVAILABLE

This is strictly a research project designed to improve understanding of fish production systems; nevertheless, participating institutions have excellent resources that can and are being tapped through buy-ins to strengthen aquaculture industries in LDCs.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$4,750,000	\$100,000
Obligation thru FY 86	4,290,000	0
FY 87 OYB	973,000	0
FY 88 anticipated (available)	920,000	0

D. COMPONENTS/ACTIVITIES

Research 100%

The research activities are targeted to :

1. Quantitatively determine how physical, chemical, and biological pond variables regulate pond activity.
2. Develop quantitative models describing these processes.
3. Transform these models into pond management models and production functions.
4. Improve the efficiency of pond culture systems.

E. PROJECT ACCOMPLISHMENTS

The Pond Dynamics CRSP, conceived as a long-term, ongoing effort, was initiated in 1982. Three institutions are equal partners in this CRSP: the Universities of Auburn and California-Davis and the Consortium for International Fisheries and Aquaculture Development CIFAD, (members: Oregon State University, University of Hawaii, University of Michigan, Michigan State University and the University of Arkansas at Pine Bluff) with Oregon State University as the implementing organization and four U.S. subgrantee institutions (Auburn, Michigan State, University of Hawaii, and the University of Michigan).

Under this project, physical, chemical and biological mechanisms regulating the productivity of pond culture systems are being studied in a continuing series of field experiments. The participating host countries are three: Rwanda in Africa, Thailand in Asia and Panama in Latin America.

F. FUTURE ACTIVITIES/PLANS

Some of the planned activities include:

- Develop production models for fish pond production under tropical conditions.
- Thailand project on low and high intensity
- Rwanda project on the use of cooler water
- Panama project on low use of brackish water and hypersaline conditions.

G. OUTPUTS IMMEDIATELY AVAILABLE

Technical report entitled "Principles and Practices of Pond Aquaculture: A State of the Art Review".  
"Aqua News" Quarterly Newsletter.

H. CONTACTS FOR SUPPORT

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FISHERIES DEVELOPMENT SUPPORT SERVICES

Project No: 936-4024

PACD: 6/30/87

A. PURPOSE

To provide technical assistance, training and information to AID and LDCs regarding fisheries development. Established priority areas include: socio-cultural factors, fisheries management and resource utilization, use of mariculture, and post-harvest fishery losses.

B. SERVICES AVAILABLE

The project can provide both technical assistance and formal and non-formal training. The later is designed to individuals with language and discipline skills less than satisfactory to entering formal training. Specific services available include:

1. Short-term advisory and consulting services up to 30 work-days per mission to assist in all aspects of design, implementation and evaluation of small scale fisheries development, marine fisheries management, stock assessment, product quality, economics and information handling activities.
2. Long and short-term training programs at URI in marine fisheries, including biology, sociology, economics, information handling and postharvest product handling.
3. Short courses, seminars and workshops to be conducted in LDCs.
4. Advice/evaluation of shrimp farming plans and proposals.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$4,000,000	\$200,000
Obligation thru FY 86		200,000
FY 87 OYB	245,000	0
FY 88 anticipated (available)	255,000	0

D. COMPONENTS/ACTIVITIES

Research 40%; Technical Assistance 30%; Training 30%

E. PROJECT ACCOMPLISHMENTS

The Fisheries Development Support Service (FDSS), conceived as a long-term, continuing effort, was initiated in 1982 under a cooperative agreement with the University of Rhode Island. Under FDSS, a number of technical assistance services have been provided to USAID missions and LDCs in marine fisheries. Training has been provided to personnel from developing countries. The International Center for Marine Resource Development has dealt with LDC issues since its formation.

Examples of accomplishments to date include:

1. Research on fisheries in Latin America and Africa.
2. Training of fisheries researchers and administrators from Asia, Africa, Latin America, and the Near East.

3. Assistance to USAID/Djibouti in project paper development for a Fisheries Development project.
4. Development of an information search capability for fisheries-related publications.
5. Studies and project assistance focussing on small-scale fishery needs and on opportunities to increase incomes and improve nutrition through fisheries management.

F. FUTURE ACTIVITIES/PLANS

Some examples of planned activities are :

1. Preliminary investigation of the portunidae crab resources in the coastal and estuarine waters of Ecuador.
2. Research on the brine shrimp (Artemia) currently a constraint on fish and shrimp production. Artemia, a main ingredient for feed supply limits the development of the commercial fish/shrimp industry.

G. OUTPUTS IMMEDIATELY AVAILABLE

Technical publications, manuals, newsletters, bibliographies and literature searches on fisheries related publications using URI's fisheries library.

H. CONTACTS FOR SUPPORT

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CRSP - STOCK ASSESSMENT FISHERIES

Project No: 936-4146

PADC: 06/30/90

A. PURPOSE

The purpose of this CRSP is to improve analytical and sampling methodology for assessment of the size and sustainable yields of tropical fisheries populations.

B. SERVICES AVAILABLE

Although this is a research project designed specifically to improve stock assessment methodology and does not include funding for technical assistance with development projects, potential exists for buy-ins to assess fishery stock yield potential and to provide national fisheries agencies with biological information (stock size, growth and mortality rates) that is needed to manage resources wisely on a sustained basis. Institutions involved house some of the most outstanding stock assessment capabilities available in the U.S.

<u>C. FUNDING</u>	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL		100,000
Obligation thru FY 86	\$1,300,000	100,000
FY 87 OYB	\$895,000	0
FY 88 anticipated (available)	\$700,000	0

D. COMPONENTS/ACTIVITIES:

Research 100%; Technical Assistance 0%; Training 0%

Project activities include development of models to test statistical gathering theories, management theories, multispecies interactions and age/size relationships. Field testing of special sampling methods including sonar are being evaluated for use in LDCs. Techniques for aging tropical fish are being studied and economic implications of new management methods are being analyzed.

E. PROJECT ACCOMPLISHMENTS

The project was initiated in December, 1984. The Management Entity is the University of Maryland with two U.S. Subgrantee Institutions, the University of Washington and the University of Rhode Island and LDC Linkages in two countries, Costa Rica and the Philippines. Research was initiated in July 1985 at the participating institutions. LDC work was begun in 1986.

The project's main accomplishments are:

1. The University of Rhode Island has developed the first stage of a useful multi-species model for tropical fisheries.

2. The University of Washington has initiated hydroacoustic (sonar) surveys of fishes in Costa Rica as input to assessment models for inshore pelagic fishes.

3. The University of Maryland has progressed further toward recruitment models, including economic aspects relating desirable levels of fishing to recruitment patterns.

F. FUTURE ACTIVITIES/PLANS:

Some of the planned activities are the following: A stock assessment manual for use by developing country fishery resource managers and researchers will be prepared utilizing results of the study. The methods developed, tested and described will provide fishery resource managers with improved scientific tools for regulating the harvesting rates of fish stock to obtain maximum sustainable yields from the resources. Benefits in terms of incomes, employment and high protein food will be substantial if improved management techniques are applied.

G. CONTACTS FOR SUPPORT:

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REPRODUCTIVE STUDIES ON MILKFISH

Project No: 936-4161

PACD: 07/14/91

A. PURPOSE

To carry out research on milkfish in southeast Asia and the Pacific

B. SERVICES AVAILABLE

Training of LDC research personnel and transfer of technology for techniques of maturing, spawning and hatchery rearing of milkfish and other marine fish

C. FUNDING

	S&T .....	<u>Buy-ins</u>
LOP TOTAL	\$4,850,000	0
Obligation thru FY 86	-	0
FY 87 OYB	1,200,000	0
FY 88 anticipated (available)	1,200,000	0

D. COMPONENTS/ACTIVITIES

Research 70%; Technical Assistance 20%; Training 10%.

The research activities of the project are the following:

1. Determine techniques to improve maturation and spawning of captive milkfish.
2. Determine techniques to improve larval survival of cultured milkfish.
3. Determine stocks/sub-populations of milkfish through electrophoresis.
4. Determine nutritional requirements of cultured milkfish, at all stages.
5. Determine environmental parameters necessary for proper culture of milkfish.

E. PROJECT ACCOMPLISHMENTS

Milkfish are a highly important food fish in southeast Asia. Two major problems exist in making the species more available and efficient to rear: 1) maturing adult fish to the spawning conditions in captivity and 2) reducing the mortality of larvae during culture, which is presently at 90%. This Cooperative Agreement directly addresses these problems through research. It allows considerable interaction between the Oceanic Institute and research institutions in LDCs which work on milkfish. Principle involvement is in Taiwan, the Philippines, and Indonesia. Scientist exchange, training and technology transfer is included.

F. FUTURE ACTIVITIES/PLANS

Research to be coordinated with TungKang Marine Research Institute in Taiwan, Southeast Asia Fisheries Development Commission in the Philippines, and the government of Indonesia.

G CONTACTS FOR SUPPORT:

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AQUACULTURE AND MANAGED FISH PRODUCTION

Project No: 936-4180

PACD: 12/31/92

**A. PURPOSE**

To provide for a strong educational program in fish culture for LDC students; to utilize Auburn University's capabilities to backstop aquacultural development in LDC's; to research and extend appropriate new technologies in fish culture to AID missions and LDC host countries.

**B. SERVICES AVAILABLE**

Buy-ins may be used to provide assistance on an as requested basis as follows:

1. Library and information services relating to all aspects of development; country surveys, research publications, extensions materials, various technical reports, and practical manuals for fish farming.
2. Assistance to USAID's and host countries on feasibility studies leading to the development of aquaculture projects and technical aspects of freshwater aquacultural development including hatchery operation, pond construction, pond management, fish nutrition and feeds, disease control and integrated animal-fish production.
3. Project development, planning and evaluation, sector assessment and advisory services relating to freshwater aquaculture.
4. Impact studies and evaluations on the design and implementation of mission-funded aquaculture operations.
5. Practical training (5-month) course at Auburn, short courses tailored to developing country needs offered in-country, graduate education in aquaculture and aquaculture-related disciplines.
6. Applied research on special problems of aquacultural development; problem-solving research team with extensive experience and facilities addressing critical problems to improve efficiency of production.

**C. FUNDING**

	S&T	Buy-ins
LOP TOTAL	\$1,275,000	\$3,565,000
Obligation thru FY 86	0	0
FY 87 OYB	0	0
FY 88 anticipated (available)	255,000	713,000

**D. COMPONENTS/ACTIVITIES**

Research 40% ; Technical assistance 30%; Training 30%

E. PROJECT ACCOMPLISHMENTS

This project is a follow-on to a previous project, Aquaculture Technology Development that began in 1978 and involved a total project funding of \$3.759 million. This program has a worldwide focus on aquaculture development in the LDC's. The cooperative Agreement has provided for sustained outputs of training, research and extension activities in support of LDC aquacultural development. An extensive and highly competent capability has been developed for education, research, technology transfer and specialized training in aquaculture. This capability has been utilized by Missions to provide both short- and long-term assistance to missions including staffing of development projects in a number of countries. Auburn has been the lead U.S. institution for freshwater aquaculture training and development for the last decade. To an increasing extent over the last few years emphasis has been placed on utilization of Auburn's capabilities in developing countries and applying trained manpower and research results to the economical production of fish

F. FUTURE ACTIVITIES/PLANS

Continued research to refine polyculture and to develop improved hybrids or genetic strains of appropriate species. Also the creation and development of fish/small animal integrated farming systems in LDC's.

G. CONTACTS FOR SUPPORT

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**V. DIVISION OF ECONOMIC POLICY AND PLANNING**

AGRICULTURE SECTOR SUPPORT SERVICES

Project No: 931-0060

PACD: 09/29/88

**A. PURPOSE**

To provide general support to AID/W and USAID field missions in economic analysis, policy and planning for agricultural development.

**B. SERVICES AVAILABLE**

None at this time.

**C. FUNDING**

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP TOTAL	\$5,460,000	0
Obligation thru FY 86	5,460,000	0
FY 87 OYB	0	0
FY 88 anticipated (available)	0	0

**D. COMPONENTS/ACTIVITIES**

Research 20%; Tech Assist 60%; Training 10%

**E. PROJECT ACCOMPLISHMENTS**

The project is implemented through a Reciprocal Support Services Agreement (RSSA) with the office of International Cooperation and Development of the USDA and draws largely on expertise of the USDA Economic Research Service in agricultural trade, production and policy issues. The project provided the assistance of agricultural economists for project design, evaluation, special study and sector analysis activities. The project has assisted USAID missions in: Sri Lanka (Sector Planning and Analysis); Honduras (Agriculture Sector Project Design); and the Dominican Republic (Price Policy Study).

**F. FUTURE ACTIVITIES/PLANS**

Funding for this project terminated in FY 1986; the remaining pipeline of funds is being used to complete studies on agriculture trade policy.

**G. OUTPUTS IMMEDIATELY AVAILABLE**

1. Agriculture Policy modeling using micro-computers; 2. Food policies in developing countries; 3. Agriculture production indices

**H. CONTACTS FOR SUPPORT**

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AGRICULTURE POLICY ANALYSIS PROJECT (APAP)

Project No: 936-4084

PACD: 9/29/88

A. PURPOSE

To support USAID policy analysis efforts through the synthesis of Agency experiences at policy analysis capacity building within host governments.

B. SERVICES AVAILABLE

A buy-in to this project can provide the following services: 1) conducting country-specific policy analysis; 2) designing and evaluating USAID policy and planning projects; 3) planning for workshops and conferences; and 4) conducting special studies related to on-going projects.

C. FUNDING

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP Total	\$6,260,000	\$2,796,795
Obligation thru FY 86	4,495,000	1,511,505
FY 87 OYB	840,000	721,261
FY 88 anticipated (available)	925,000	563,973

D. COMPONENTS/ACTIVITIES

Research 30%; Technical Assistance 55%; Training 15%

E. PROJECT ACCOMPLISHMENTS

Because economic policies affecting agriculture are often made outside the sector, the Agency has sought to build understanding of how such policies impact on the production of and demand for farm products in LDCs. The Agriculture Policy Analysis Project (APAP) was designed in 1983 to: 1) distill lessons we have learned about how to assess the impact of economic policy on agriculture sector performance; 2) assist USAID missions in building capacity in LDCs to conduct their own analysis in support of formulating and monitoring policies affecting the sector. With this added understanding and analytical capacity in A.I.D. and host countries alike, more substantive dialogue on needed policy changes will be possible.

The Agricultural Policy Analysis Project (APAP) started officially on September 30, 1983 when A.I.D. signed a contract with Abt Associates, Inc., to implement the subject project, which is broadly subdivided into worldwide and country activities.

Worldwide activities are those that apply to all USAID Missions, Regional Bureaus and AID/W offices. They consist of five discrete activities: (1) development of roster of policy analysts, (2) formulation of Agricultural Development Officers Guidelines, (3) formulation of Agricultural Policy Analysis Guidelines, (4) evaluation of A.I.D. funded agricultural policy and planning projects, and (5) establishment of agricultural policy decision makers network.

## F. FUTURE ACTIVITIES/PLANS

ST/AGR proposes to implement a second phase five-year competitively bid contract for further APAP activities beginning early in FY 1989. During the second phase the research focus concentrate on economic structural adjustment and trade policy issues as they affect performance of the agricultural sector. Another research area will address AID's experiences in the political economy of policy reform, eg. the dynamics of interest group participation in and influence on the policy making process.

## G. OUTPUTS IMMEDIATELY AVAILABLE

1. Comparative Analysis of AID Agriculture Policy Projects. An "Executive Summary" and reference volumes that synthesize lessons learned in building LDC government policy analysis capacity.

2. Agriculture Officers Guidelines. A short summary of steps to follow for effective policy analysis project design and implementation.

3. Agriculture Policy Analysis Guidelines. A technical reference for use by practitioners on methods in the analysis of price, subsidy, tariff, quota and related market regulation policies.

4. Agriculture Policy Consultants Roster. A micro-computer based file of nearly one hundred policy consultants coded and categorized by area of specialization, regional and country experience and language ability.

5. Agriculture Workshop Training Modes. A report on the major modes that have been identified for training policy analysts and policy makers.

6. Country Case Studies and Staff Papers. A series of technical reports that examine in greater detail experiences in policy analysis capacity building, policy reform for parastatal divestiture, price policy analysis and the use of food aid as a policy reform tool.

## H. CONTACTS FOR SUPPORT

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FAMING SYSTEMS SUPPORT PROJECT (FSSP)

Project No: 936-4099

PACD: 12/31/87

**A. PURPOSE**

To support USAID and LDC's Agricultural Research and Extension Institutions in the design implementation and evaluation of Farming Systems Research and Extension (FSR/E) programs.

**B. SERVICES AVAILABLE**

USAID missions can access services, on a buy-in basis, for both technical assistance and training in FSR/E. In training the following services are available:

a) Deliver Shortcourses:

- Regional Shortcourse, English (3 weeks)
- Regional Shortcourse, French (3 weeks)
- Regional Shortcourse, Spanish (3 weeks)
- Individual shortcourses on various aspects of FSR/E

b) Support Training Programs:

- Train Trainers
- Advise National Programs on a training strategy

c) Develop Training Materials:

- Slide Tape Modules
- Training Units
- Case Studies

**C. FUNDING**

	<u>S&amp;T</u>	<u>Buy-ins</u>
LOP Total	\$7,887,000	\$2,065,000
Obligation thru FY 86	5,782,000	382,000
FY 87 OYB	300,000	80,000
FY 88 anticipated (available)	0	1,603,000

**D. COMPONENTS/ACTIVITIES**

Training 50%, Networking 30%, Technical Assistance 20%.

**E. PROJECT ACCOMPLISHMENTS**

The project, conceived as a ten year effort, was initiated in 1982 under a Cooperative Agreement with the University of Florida. The project has a worldwide scope, with emphasis in West African countries. The main focus of the project was to develop a set of training manuals and to support network efforts in FSR/E. Training has emphasized the identification of constraints limiting the adoption of appropriate technologies, specification of new appropriate technologies and improvement in technology development for limited resource farmers. Three sets of training manuals have been completed:

- Diagnosis in FSR/E
- Techniques for Design and Analysis of On-Farm Experimentation
- Microcomputer Software for Agricultural Researchers (MSTAT)

FSSP contributed to the development of MSTAT through a bilateral agreement with the University of Michigan. This manual is available in French, Spanish and English, while the two others have been translated into French.

Training has been provided both to LDC researchers and selected staff of 21 U.S. universities. Over 650 professionals have been trained and at least 17 countries, 20 LDC universities and 21 U.S. universities have received copies of at least one of the completed FSR/E training manuals. During the summer of 1987, U.S. researchers associated with the Bean/Cowpea and Sorghum/Millet CRSPs, as well as Honduran researchers and extension agents have received training in FSR/E methodologies through bilateral arrangements with the University of Florida. This training program is part of the University of Florida's decision to incorporate FSR/E training as part of its regular curriculum in agriculture; American and foreign students are the beneficiaries of this program since fall of 1986.

In networking, FSSP has helped to develop and support two network efforts: the West Africa Farming Systems Research Network (WAFSRN) which involves 18 countries, and the West Africa Integrated Livestock System Network that involves 10 countries.

In supporting and strengthening networks of farming systems professionals world-wide, FSSP has supported the Annual Farming Systems Symposium held at Kansas State University until 1986. (The 1987 Symposium will be held at the University of Arkansas on October 18-21, 1987). Each 200 to 300 professionals worldwide have participated in a week-long symposium. To complement these network efforts, FSSP reaches more than 500 FSR/E professionals world-wide through trimestral newsletters which are produced in English, French and Spanish.

In technical assistance, FSSP has assisted USAID missions in Kenya, Gambia, Malawi, Senegal, and Togo in the Africa Region; Paraguay, Peru, Bolivia, Ecuador, Belize, Honduras, Guatemala, Dominican Republic, Jamaica, Haiti, and two Regional Offices (ROCAP in Central America and RDO/C in the Caribbean) in the Latin America and Caribbean Region. Assistance involved training in FSR/E methods and helping with project development and evaluation. During spring 1987, FSSP has finalized the evaluation of the USAID/Cameroon National Cereals Program, which had Farming Systems Research and Extension as one of its main components.

#### FUTURE ACTIVITIES/PLANS

1. Training - Three additional sets of training manuals will be finalized by fall 1987:
  - Livestock in FSR/E
  - Economic Analysis of FSR/E, and
  - Management and Administration of FSR/E.
  - Through a bilateral agreement between the University of Florida and the CRSP, training in FSR/E methodologies will be provided to key scientists of the Sorghum/Millet and Beans/Cowpeas CRSP.
2. Technical Assistance - Proposed activities for 1987 include work in Niger, Mali, Mauritania, Senegal, Zaire, Ecuador, and Honduras.

3. FSSP Second Phase - S&T/AGR in coordination with S&T/RD and S&T/ED will develop, during the summer of 1987, a concept paper which will help in determining the appropriateness of an FSSP Project Paper Amendment for a second phase activity.

G. OUTPUTS IMMEDIATELY AVAILABLE

1. **Training Manuals** Three sets are available: Diagnosis in FSR/E; Techniques for Design and Analysis of On-Farm Experimentation, and; Microcomputer Software for Agricultural Researchers (MSTAT). The first completed set focuses on Diagnosis in FSR/E, including initial diagnosis, links between social and biological science, intra-household considerations and socio-cultural issues. The rapid appraisal approach used for initial diagnosis offers the opportunity of identifying not only biological constraints at the farm level but also policy constraints that are impeding the adoption of appropriate technologies.

The second set of training manuals deals with Techniques for Design and Analysis of On-Farm Experimentation. This set is linked to the longer-term objectives of FSR/E, the identification and development of appropriate technologies to be mixed with traditional technologies.

The third available set, developed by Michigan State University, consists of a microcomputer program (MSTAT) targeted to facilitate effective research programs. This program enhances the ability of researchers to handle large sets of data, helps them in determining research priorities and problems, and facilitates the generation of new appropriate technologies. The MSTAT training manual can be obtained directly from Michigan State University by contacting Dr. Russell Freed, MSTAT Director, Department of Crop and Soil Science, Michigan State University, East Lansing, Michigan, 48824-1114.

2. **FSR/E Bibliography:** A FSR/E Annotated Bibliography, containing approximately 1250 entries and 300 yearly supplemental entries, is available in microfiches through the Library of Kansas State University. French and Spanish translations for most of the entries are available.

3. **Technical reports:**  
a) FSR/E Networking papers  
b) FSR/E Technical papers

H. CONTACTS FOR SUPPORT

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**VI. INTERNATIONAL AGRICULTURAL RESEARCH CENTERS**

Current Status and Activities of the  
International Agricultural Research Centers

Seventeen centers receive core budget support from A.I.D. Two others receive special project grants to undertake specific research and development activities. Each center is listed below, noting any outstanding issues or recent achievements, plus funding data on each.

Before beginning the listing, two system-wide issues are noted:

Africa - an increasing amount of the centers' effort and resources is addressing agricultural research and production in Africa. Coordination of center activities has grown as the need for multi-disciplinary effort has become more evident. The centers are also cooperating in donor efforts to work more effectively in a concerted fashion, for example through the World Bank sponsored Special Program on African Agricultural Research (SPAAR).

Scientific Linkage to U.S. Research Institutions - Also noteworthy is the increasing collaboration of the centers with U.S. researchers and institutions. The small but effective Scientific Liaison Officer activity depends on the interest and skills of key U.S. scientists, acting in a volunteer capacity, to assist and foster technical cooperation with the centers. The "Special Constraints" collaborative research project provides funds to focus the expertise and facilities of U.S. universities or other research institutions on difficult problems facing centers, but beyond their technical or resource capabilities.

CGIAR Centers

International Center for Tropical Agriculture (CIAT), Columbia. CIAT continues to make excellent progress in rice and has received special recognition for recent breakthroughs in bean virus resistance and associated production increases. Funding: 1986 core budget \$21.4 million, A.I.D. contribution \$5.6 million, 26.2%.

International Maize and Wheat Improvement Center (CIMMYT), Mexico. The maize improvement program impact is growing; a forthcoming NAS study indicates major potential return to years of CIMMYT research on high-lysine maize and triticale. Funding: 1986 core budget \$21.9 million, A.I.D. contribution \$6.1 million, 27.9%.

International Rice Research Institute (IRRI), Philippines. IRRI continues to provide world-wide rice research leadership and is sensitive to issues raised in Congress. Research focuses on non-export rices. With Dr. Swaminathan retiring in 1987, A.I.D. is suggesting candidates for the new Director General. Funding: 1986 total budget \$22.9 million, 1986 A.I.D. contribution \$6.05 million, 26.4%.

International Potato Center (CIP), Peru. CIP also is the world leader in its field, and most recently has made significant strides in the study and control of several viruses, greatly facilitating movement of disease-free germplasm. A new trust is limited research and germplasm activity with sweet potato. Funding: 1986 core budget \$11.8 million; A.I.D. contribution \$2.325 million, 20.3%.

International Board for Plant Genetic Resources (IBPGR), Italy. The IBPGR-FAO working relationship appears to be improving. The Board continues to pursue a scientifically strong research and service program. Funding: 1986 core \$4.5 million; A.I.D. contribution \$975,000, 20.6%.

International Center for Agricultural Research in the Dry Areas (ICARDA), Syria. ICARDA has completed its building phase, focusing strongly now on agronomy and soils research in its cereals, legume and forages improvement program. Funding: 1986 core budget \$18.2 million; A.I.D. contribution \$5.6 million, 30.8%.

International Center for Crops Research in the Semi-Arid Tropics (ICRISAT), India. ICRISAT continues to expand its activities in semi-arid Africa. Promising new sorghum and millet varieties for the Sahel region are noteworthy. The new ICRISAT Sahelian Center in Niger serves as a focal point for the activities of several other centers as well. Funding: 1986 core budget \$22.1 million; A.I.D. contribution \$4.85 million, 21.7%.

International Food Policy Research Institute (IFPRI), U.S. IFPRI has greatly expanded its Africa programs and is working closely with many A.I.D. missions there and elsewhere. Funding: 1986 core budget \$4.8 million; A.I.D. contribution \$1.5 million, 31.3%.

International Institute for Tropical Agriculture (IITA), Nigeria. IITA plays a lead role in research on alley cropping, which holds great potential for humid and sub-humid Africa. The center received this year's King Baudouin award for its work on maize streak virus resistance. Funding: 1986 core budget, 21.9 million; A.I.D. contribution, \$6.3 million, 28.8%.

International Livestock Center for Africa (ILCA), Ethiopia. While its research program has continued to strengthen and progress (it received good marks in this year's external review), ILCA has suffered due to difficulties between management and the Board of Trustees. A new DG has arrived, and the board chairman soon retires. An effort is being made to ensure that the problem does not recur. Funding: 1986 core budget \$14.8 million; A.I.D. contribution \$3.475 million, 23.5%.

International Laboratory for Research on Animal Diseases (ILRAD), Kenya. ILRAD continues cutting edge research on Trypanosomiasis and East Coast Fever, both devastating to African livestock. A vaccine for ECF has been developed and is currently being tested. Funding: 1986 core budget \$10.1 million; A.I.D. contribution \$2.525 million, 25.1%.

International Service for National Agricultural Research (ISNAR), Netherlands. ISNAR services are in demand from LDCs and donors. The center is held in high regard by A.I.D. missions, and has developed close working relationships with many of them. Funding: 1986 core budget \$4.2 million; A.I.D. contribution \$950,000, 22.6%.

West Africa Rice Development Association (WARDA), Liberia, WARDA remains in a period of transition after a prolonged managerial and financial crisis, but its situation appears to be improving. Most notable is the agreement of the African member states to remove WARDA's sizeable debt; substantial progress has been made. Funding: 1986 core budget \$2.8 million; no A.I.D. core funding has been provided since the late 1970s, but AFR provided about \$2 million in project support.

## Other Centers 1/

Asian Vegetable Research and Development Center (AVRDC), Taiwan. AVRDC continues to make a significant impact despite a limited budget. Its successful home vegetable gardening activities in Asia are being modified for application in Africa under a new A.I.D.-funded activity to combat vitamin A deficiency. A new DG (American) recently arrived. Funding: 1986 budget \$4.5 million; A.I.D. contribution \$1.0 million, 22.2%.

International Fertilizer Development Center (IFDC), IFDC is expanding its African activities, most recently through its new site in Togo. Funding; 1986 budget \$8.5 million; A.I.D. contribution \$4.0 million, 47%.

International Irrigation Management Institute (IIMI), Sri Lanka. IIMI's programs are developing well and generating much interest, but the center continues to suffer from a lack of core support. Prospects for increased World Bank involvement are good, providing some relief to the institutional support problem. Funding 1986 budget \$2.7 million, A.I.D. contribution \$250,000, 9.25%.

International Center for Living Aquatic Resources Management (ICLARM), Philippines. A small center doing excellent fisheries research on a shoestring budget, ICLARM also suffers from a lack of core funding, and is currently trying to attract new donors as it adjusts to the loss of Rockefeller funds, and the anticipated decrease in A.I.D. funding. Funding: 1986 budget \$2.5 million; A.I.D. contribution \$500,000 (\$200,000 from S&T, \$300,000 from ANE), 20%.

International Board for Soils Research and Management (IBSRAM), Thailand. IBSRAM is primarily a soils research information exchange and coordination activity. It is working closely with centers, national programs and other soils research programs. Funding: 1986 budget \$700,000; A.I.D. contribution \$50,000, \$7.1%.

International Center for Insect Physiology and Ecology (ICIPE), Kenya. ICIPE research focuses on various crop and livestock insect pests. A.I.D. provides special project support for research on ticks (S&T) and plant resistance to insect attack (AFR). Funding: 1986 budget \$6.5 million; A.I.D. provides no core support, but approximately \$600,000 project funds supported the two special projects noted above.

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1/ The distinction between core and extra-core funding varies among the centers outside the CGIAR--budget figures listed reflect principal headquarters-based and core-like activities.