

**A PROGRAM GUIDE TO
THE OFFICE OF AGRICULTURE
BUREAU FOR SCIENCE AND TECHNOLOGY
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT**

February, 1989

Prepared by the:
Office of Agriculture
Bureau for Science and Technology
U.S. Agency for International Development
Washington, D.C.

OFFICE OF AGRICULTURE (S&T/AGR)

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PROGRAM GUIDE TO THE OFFICE OF AGRICULTURE

BUREAU FOR SCIENCE AND TECHNOLOGY

I. Overview of the Office of Agriculture

Agency focus. 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 resource base. The Office of Agriculture has the responsibility to assist the Agency in the implementation of this focus through the management and direction of its centrally funded research and development portfolio in agriculture--crops, livestock and fisheries, natural resources (soil and water), and economic and agricultural policies. The Office also provide technical leadership in the broad range of activities related to international agriculture development.

Program Strategy. In addressing the goals of the Agency's agriculture focus, the Office of Agriculture:

- 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 and scientific relationships with the international agricultural research centers (IARCs);
- Supports the strengthening of national research capability in LDCs, and of international research networks linking scientists in developed and developing countries as well as in international research centers; and
- Provides technical support and guidance to the Agency in relation to particular subject matter areas.

Organization of the Office of Agriculture. For management purposes, the S&T/AGR portfolio is divided into three divisions as shown in the S&T/AGR Organizational Chart (p. xi):

- 1) Agricultural Production Division (AP): Supports research activities in the areas of crops, livestock, postharvest technology and utilization.
- 2) Renewable Natural Resources Management Division (RNRM): Sustains research and development activities in the areas of water use, soil management, soil microbiology, and fisheries.
- 3) Economic Policy and Sector Analysis Division (EPSA): Supports research activities in the areas of economic and agricultural policy as well as farming systems and sustainable agriculture.

To support the activities of these divisions, the Director of the Office of Agriculture is assisted by the Program staff and two assistants, one Special Assistant for Operations and one Special Assistant for Communications.

Mission Access to S&T/AGR Technology Support Services

USAID Missions, LDC institutions, U.S. institutions, U.S. industry, consulting firms and other donors benefit from the research program supported by S&T/AGR. Such a research program has produced technological breakthroughs and developed a network of technical experts who can provide numerous services. Field Missions may access research and technical services related to crop and livestock production, soil and water management, fisheries and aquaculture development, biotechnology, agroeconomic policy and planning, integrated pest management and postharvest technologies. They can also receive backstopping from U.S. institutions that: (1) have worldwide contracts, cooperative agreements or grants with S&T/AGR; (2) employ their scientists and other professionals on a long-term basis to address the needs of the developing world; (3) have wide experience working in LDCs; and (4) have established extensive networks linking scientists and other professionals in the developing and developed world.

USAID Missions can access scientific and professional services from the Office of Agriculture through three, relatively quick and cost-effective mechanisms described in the following sections: (1) the noncompetitive award of orders under a Basic Ordering Agreement (BOA) which is issued as a companion instrument to a cooperative agreement or grant; (2) a Ribbon Contract; or (3) a Ribbon PASA. The services provided under these mechanisms must be directly related to the research program and program description supported by the centrally-funded core grant, cooperative agreement, contract or PASA.

1. Basic Ordering Agreements (BOA's). These documents are issued as companion instruments against cooperative agreements and grants. They provide for the non-competitive issuance of Missions and AID/W funded delivery orders to obtain short-, medium-, and long-term services. These services include adaptive and developmental research, training, technical advisory services to plan, design, test and evaluate programs and projects directly related to the research funded under the relevant S&T/AGR project. The BOAs are not contracts, do not represent contractual obligations and imply no agreement on behalf of the Agency to place future delivery orders with the institutions involved. Once an agreement is consummated it becomes a contract.

Funds are obligated by delivery orders funded by requesting missions, regional bureaus and A.I.D./W offices and signed by the A.I.D./W contracting officer. The approval process is essentially the same as an IQC delivery order; therefore, sufficient time should be allowed to complete the process. However, there are three key differences: (1) these delivery orders are issued by SER/OP/W/FA and not by the procurement branch which normally services the region; (2) contractors will be paid by A.I.D./W instead of the USAID; and (3) S&T/AGR project manager supervises the buy-in activity.

BOAs are in place with the implementing institutions for nine projects and two Collaborative Research Support Programs (CRSPs). The latter are designed on a program, rather than a project basis. CRSPs address multisectoral, biological, physical, social and economic constraints through collaborative efforts of multidisciplinary teams. Those teams work together on many research activities which are being implemented in several countries, including the U.S.A., and at the international agricultural research centers (IARCs). The BOAs in place are the following:

936-4024, Fisheries Development Support Services (University of Rhode Island) BOA # DAN-4024B-00-8001-00.

936-4180, Aquaculture Technology Development (Auburn University)
BOA # DAN-4180-00-8009-00.

936-4054, International Benchmarks Sites Network (University of Hawaii)
BOA # DAN-4054-00-8020-00.

936-4177, Improved BNF thru Biotechnology (University of Hawaii)
BOA # DAN-4177-00-7002-00.

936-4143, R&D of Improved Seed Production and Utilization (Mississippi St. U.)
BOA # DAN-4143-00-7001-00.

936-4144, Postharvest Grain Systems R&D (Kansas State University)
BOA # DAN-4144-00-6002-00.

931-1323, Storage/Processing Fruits/Vegetables (University of Idaho)
BOA # DAN-1323-00-8017-00.

931-0054, International Fertilizer Development Center
BOA # DAN-0054-00-8023-00.

936-4132, Soybean Utilization and Research (University of Illinois)
BOA # DAN-4132-00-8036-00.

931-1311 Soil Management (North Carolina State University)
BOA # DAN-1311-B-00-8040-00.

936-4048 Peanut CRSP (University of Georgia)
BOA # DAN-4048-B-00-8045-00.

In addition to the above projects, S&T/AGR is working with the Office of Procurement to issue BOA's for the following CRSPs and projects:

931-1254 Sorghum/Millet CRSP (University of Nebraska)

931-1310 Bean and Cowpea CRSP (Michigan State University)

931-1328 Small Ruminants CRSP (University of California, Davis)

936-4012 Pond Dynamics CRSP (Oregon State University)

936-4146 Stock Assessment CRSP (University of Maryland)

936-4161 Reproductive Studies of Milkfish (Oceanic Institute, Hawaii)

936-4137 Biotechnology - Plant Tissue Culture (Colorado State University)

931-0621 Spring and Winter Wheat (Oregon State University)

2. Ribbon Contract. This is a contractual arrangement with an S&T/AGR funded institution whereby the missions, regional bureaus and other A.I.D./W offices can fund services under the basic contract. S&T/AGR currently has two ribbon contracts:

936-4142, IPM and Environmental Protection, including Bio-Control (University of Maryland, Consortium for International Crop Protection)

R.C. # 4142-C-00-5122-00.

936-4084, Agricultural Policy Analysis (Abt Associates)

R.C. # DAN-4084-Z-00-8034-00.

3. Ribbon PASA. This contractual arrangement is an agreement with another participating federal agency whereby the missions, regional bureaus and A.I.D./W offices can fund services under a basic PASA. S&T/AGR currently has three ribbon PASAs in place:

931-1229, Soils Management Support Services (USDA/Soil Conservation Service) R.P. #

DAN-1229-X-AG-7051-00.

936-4021, Technology of Soil Moisture Management (USDA/Ag Research Service) R.P. #

DAN-4021-X-AG-7020-00.

936-4173, Vertebrate Pest Management Systems (USDA/Denver Wildlife Res. Cent.) R.P. #

DAN-4173-X-AG-6001-00.

Operational Procedures for accessing S&T/AGR services: Missions requiring services available under BOAs, Ribbon Contracts and PASAs already signed must submit a funded PIO/T providing the funding citation to the appropriate ST/AGR project manager who will forward the information to SER/OP/W/FA for processing. Upon receipt of the request to initiate the buy-in process, assuming a buy-in is appropriate, the contracting officer shall provide the contractor with the statement of work and other relevant information and shall request a proposal from the contractor for performance and cost of that activity. For additional information on the content of PIO/Ts and contracting procedures, refer to worldwide cable, State 240152 of July 1988, and subsequent cables on individual project BOAs.

S&T/AGR Newsletter: The S&T/AGR Office has initiated the quarterly publication of the Science and Technology Agricultural Newsletter (**STAR**), a describing S&T/AGR's worldwide project activities. Contact Editor Harold A. (Hal) Le Sieur to be included on the mailing list.

As you make use of S&T/AGR services, we encourage your comments as to performance of our projects in your country as well as to areas of need to which our office should seek to be responsive in the future.

Additional copies of this Program Guide can be obtained from:

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CONTACTING S&T/AGR

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Activity Area	Name	Phone (703)
<u>Directorate</u>		
Director	BATHRICK, David D.	875-4300
Secretary to the Director	PODRASKY, Mary Anne	875-4300
Special Assistant for Program	ROCHE, Elizabeth	875-4168
	BECKETT, Betty J.	875-4126
	BLAKENEY, Mildred	875-4041
	HOWELL, Renee	875-4107
Special Assistant for Operations	SCHULZE, Loren L.	875-4049
Special Assistant for Communications	Le SIEUR, Harold	875-4266
<u>Agricultural Production Division</u>		
Chief/Horticulturist/Plant Physiologist	HORTIK, Harvey H.	875-4304
Seed/Postharvest/Agronomist	MERTENS, Frank	875-4245
Crop Protection/Pesticide Chemist	COLLIER, Carroll	875-4024
Crop Protection/Plant Pathologist	WAITE, Benjamin	875-4324
Livestock Production/Animal Scientist	TURK, Joyce	875-4081
Livestock Health/Veterinarian	LUCHSINGER, Donald	875-6414
Crop Production/Agronomist	SCHAFFERT, Robert	875-4320
Biotechnology/Tissue Culture/Biotechnologist	COHEN, Joel	875-4219
Chief Secretary	WILLIS, Bess	875-4304
Support Staff	ASGHAR, Karin	875-4201
	ENGRAM, Katherine	875-4201
	HERBERT, Kelli	875-4123
<u>Renewable Natural Resources Management Division</u>		
Chief/Agronomy	GILL, Tejpal	875-4307
Dryland Agriculture	MEYER, Raymond	875-4122
Water Management	FITZGERALD, Worth	875-4231
Soil Fertility	MALCOLM, John	875-4328
Microbiology	FREDERICK, Lloyd	875-4173
Fisheries/Aquaculture	NEAL, Richard	875-4027
Fisheries	TROTT, Lamarr	875-4098
Aquaculture	JONES, Chris	875-4016
Natural Resources	POTTER, Christopher	875-4338
Chief Secretary	PATTERSON, Christine	875-4307
Support Staff	HUTCHINSON, Denita	875-4160
	McPHAUL, Debbie	875-4042

Economic Policy and Sector Analysis Division

Chief/Agricultural Economist	CUSUMANO, Vincent	875-4218
Agricultural Policy Analysis	GOODWIN, William	875-4015
Production Economics/Food Policy	LU, Chung Chi	875-4249
Environmental Concerns/Sustainable Ag	GROVE, Thurman	875-4045
Agriculture Data Systems, Natural Resources	PIPER, Dan	875-4337
Chief Secretary	CABCABIN, Diana	875-4218
Support Staff	ARCHIE, Tonya	875-4109

S&T/AGR Staff Bio-Sketches

David Bathrick – Director of the Office of Agriculture

Masters – International Agriculture Development Cornell Univ., (1979), and Political Science (1970), Arizona State Univ.; B.A. – Political Science and Animal Science (1964), Washington State University.

Experience: Vietnam, Peru, Bolivia and Nicaragua – Project Officer; Thailand and Peru, Supervisor Agricultural Development Officer.

Languages: Spanish, Thai and Vietnamese.

Roberto Castro – Agricultural Economist

Ph.D. – Economics (1973), Masters – Ag. Economics (1970), both from North Carolina State University; Magister – Soil Science, B.S.–Agronomy (Tropical Ag).

Experience: Agrarian Reform, Peru; technical advisor, Honduras (ag. policies, agroindustries, agricultural diversification).

A.I.D.: LAC/DR/RD, USAID/Dominican Republic, S&T/AGR – Ag. Economist.

Languages: Spanish

Joel I. Cohen – Biotechnology and Plant Germplasm Genetist

Ph.D. – Plant Breeding and Molecular Genetics (1982), B.S.– Plant and Soil Sciences, both from University of Massachusetts.

Experience: Research Station Manager and Biotech Liaison Officer, Dekalb–Pfizer Genetics; Peace Corps–Nepal; AAAS Fellow.

A.I.D.: S&T/AGR/AP, USAID/India (TDY)

Languages: French and Nepalese

Carroll Collier – Pesticide Chemist

Masters – Biochemistry (1953), Purdue University; B.S. – Chemistry (1951), Michigan State University

Experience: USDA, FAO (Mexico), EPA, Union Carbide & Monsanto: Insect Pest Management, Pesticide Registration & Residue Analysis, Environmental Fate.

A.I.D.: ST/AGR/AP

Languages: Spanish

Vincent Cusumano – Chief, Economic Policy and Sector Analysis Division

Ph.D. – Agricultural Economics (1974), M.A. Economics (1970), both from University of Kentucky; B.S., Bradley University (1966).

Experience: Project Economist, Brazil (FAO), Assistant Professor of Agricultural Economics.

A.I.D.: LAC/DR/RD, Agricultural Economist; USAID/Ecuador, Rural Development Officer, USAID/Haiti, Supervisor Agricultural Development Officer; S&T/AGR.

Languages: Spanish, French, Portuguese and Italian.

Worth Fitzgerald – Water Management Specialist

Ph.D. – Agricultural Economics (1969), M.S. – Indus. Admin. and Agr. Engineering (1963); both from Purdue University B.S. – Agr. Engineering (1959), Bus. Admin. (1959), all from Kansas State University and Agronomy (1951).

Experience: Farm Mgt Specialist – F.A.O.; Ext. Economist – Univ. Minn. (1968–70); Irrigation Engineering – Kansas State Univ. (1959–68).

A.I.D.: NE/TR/TECH – Prod. Economist; S&T/AGR/RNRM – Water Mgt. Specialist.

Lloyd R. Frederick – Senior Soil Microbiologist

Ph.D. – Soil Microbiology (1950), M.S. – Soil Microbiology (1947), both from Rutgers University; B.S. – Agronomy (Soils) (1943), University of Nebraska.

Experience: Professor, Iowa State University; Research Prof – Purdue University; farm manager; consultant, W.R. Grace & Co and Research Seeds, Inc.

A.I.D.: S&T/AGR/RNRM.

Tejpal S. Gill – Senior Agronomist, Chief RNRM Division.

Ph.D. – Agronomy (1954), Rutgers Univ; M.S., Plant Breeding (1950) Utah State University; B.S. Agriculture (1948)

Experience: U.S. and International Agricultural R&D companies (1954–71);

A.I.D.: S&T/AGR/RNRM R&D in sustainable natural resources (soil, water and fertilizer); and computerized agrotechnology transference and decision making mechanisms (1971–present).

Languages: Urdu, Hindi and Punjabi.

William Goodwin – Agricultural Economist

Education: M.S. – Food and Resource Economics, Latin American Studies, Tropical Agriculture (1976); B.S.– Agricultural Economics and Statistics, Univ. of Florida.

Experience: Agricultural Policy Analysis, coops, agrarian reform, Peace Corps–Venezuela, USDA/OICD (Dominican Republic, Guyana, Guatemala, E. Caribbean).

A.I.D.: LAC/DR/RD, USAID/Honduras, USAID/Philippines, S&T/AGR.

Languages: Spanish

Thurman L. Grove – Agricultural Ecologist

Ph.D. – Soil Science and Ecology (1983) from Cornell University; B.A. – Biology

Experience: Industrial Manager; Environmental Consultant; research associate in ecology and soil science; consultant in Brazil, Caribbean, Kenya, Zambia, Zimbabwe.

A.I.D.: IPA with S&T/AGR.

Languages: French

Harvey Hortik – Chief AP Division/Sr. Horticulturist/Plant Physiologist

Ph.D. & M.S. – Horticulture/Plant Physiology (1962), B.S.– Horticultural Food Crops (1957), all from University of Illinois.

Experience: Libby foods, Plant Physiologist/Crop Ecologist, Assoc. Direc. & Director Ag Research (U.S. and Int'l.); Nestle Foods, Director Ag Research.

A.I.D.: S&T/AGR/AP – Sr. Horticulturist & Division Chief (1986 to present).

Chris R. Jones – Fisheries Advisor

M.S. – Fisheries Biology, U. of Wash. (Seattle) 1974; B.S.– Bus. Admin., U. of Calif. (Berkeley) 1965.

Experience: Aquaculture, Resource management; Small-scale fisheries; Instructor (Philippines); Development Program Manager.

A.I.D.: S&T/AGR/RNRM.

Languages: French and Spanish (Read both, speak some French).

Chung-Chi Lu – Agricultural Economist

Ph.D.– Agricultural Economics (1973), M.S.– Agricultural Economics (1968), both from Iowa State University.

Experience: Asst. Prof. of Econ., Kentucky; Consultant Economist/Agr. Economist to IBRD, OAS, IFAD; Economist, FAO, Rome.

A.I.D.: ASIA/TR/ARD, USAID/Bangladesh, S&T/AGR.

Languages: Japanese and Chinese.

Donald W. Luchsinger – Animal Health Advisor

DVM – (1961), MPH (1966) both from Univ. of Minnesota; Senior Management, USDA.

Experience: Field Epidemiology, APHIS U.S.; technical advisor PAHO, Jamaica; Staff Officer APHIS, DC; Area Vet-in charge APHIS, Minn; Laboratory Director.

A.I.D.: S&T/AGR/AP.

John L. Malcolm – Senior Soil and Fertilizer Specialist

Ph.D.– Soil Science (1948), M.S.– Soil Science (1945), B.S.– Soil Science (1943) all from Rutgers University.

Experience: Univ. of Florida, FAO–Ghana, Soil fertility mgt for horticulture, tropical field crop research, fertilizer control, program planning, & use.

A.I.D.: El Salvador, India and S&T/AGR/RNRM.

Frank Mertens – Agronomist/Ecologist

Ph.D.–Ecology (1973), Univ. Cal. Davis; M.S.– Int'l. Agricultural Development/ Agronomy & Veg. Crops (1971) .

Experience: Irrigation projects–Libya & Nigeria; Dev. pilot farms–Oman & Qatar; Rubber plantation development–Liberia.

A.I.D.: USAID Ghana), USAID Yemen, S&T/AGR/AP.

Languages: German, Dutch.

Raymond E. Meyer – Soil and Water Management/Dryland Ag Specialist

Ph.D.– Soil Physics (1963), Okla. State Univ., B.S.–Agronomy, Kansas State.

Experience: Consultant, agronomist Utah State–Peru & Int'l Potato Center–Peru; professor in soil physics–Peru & Texas Tech.; Peace Corps–Peru; USDA; farmer.

A.I.D.: LAC/DR/RD, S&T/AGR/RNRM.

Languages: Spanish

Richard Neal – Senior Fisheries Specialist

Ph.D.– Fisheries (1967), Univ. of Washington; M.S.– Fisheries (1962), B.S.– Fish and Wildlife Management (1961), both from Iowa State University.

Experience: Fresh water fisheries biology, limnology, shellfish, population dynamics, shrimp aquaculture, research administration.

A.I.D.: S&T/AGR/RNRM.

Daniel Piper – Agricultural Economist

Ph.D.– Agricultural Economics (1972), Michigan State University; M.S.– Agricultural Economics (1967), B.S.– Agriculture, both from Ohio State University.

Experience: Agricultural Marketing–Ohio, Benefit–Cost Analysis–Michigan, Regional Planning–Nebraska & California, Farm Machinery Supply and Demand–Washington, D.C.

A.I.D.: S&T/AGR/EPASA.

Languages: German

Christopher Potter – Ecologist/Natural Resources Conservation

Ph.D.– Ecology and Evolutionary Biology (1987), M.S.– Ecology (1986), both from Emory University, Atlanta, GA; B.A.– Biology

Experience: Forest Management and Agroforestry, Tunisia.

A.I.D.: AAAs Fellow, S&T/AGR/RNRM.

Languages: French

Robert E. Schaffert – Sr Agronomist

Ph.D.– Plant Breeding and Genetics (1972), Purdue University; M.S.– Plant Breeding and Genetics (1967), B.S.– Agronomy (1966), both from Univ. of Nebraska.

Experience: Teaching Agronomy and Genetics, Purdue University; Strengthening Ag Research–Brazil; National Sorghum & Maize Research Coordinator, EMBRAPA/IICA/World Bank–Brazil.

A.I.D.: S&T/AGR/AP.

Languages: Portuguese and Spanish

Loren L. Schulze – Agronomist/Special Assistant to the Director

Ph.D.– Plant Physiology (1978), M.S.– Agronomy (1976), both from the University of Georgia; B.S.– Agronomy (1969), University of Nebraska–Lincoln.

Experience: Peace Corps–Colombia; Instructor of Agronomy, University of Georgia .

A.I.D.: USAID Lima; S&T/AGR/AP; S&T/AGR.

Languages: Spanish

Lamarr B. Trott – Senior Fisheries Advisor

Ph.D.– Zoology, (1967), UCLA; M.S., B.A.– Biology, (1960, 1957), both from Florida State University; A.A. (1955), St. Petersburg J.C.

Experience: Science and Environment, National Marine Fisheries Service (Director, Dep Director & Division Chief); Marine Science Lab., Hong Kong Univ.

A.I.D.: Indonesia, Philippines, Thailand, South Pacific, Costa Rica, Guatemala, W. Africa (TDYs); S&T/AGR/RNRM.

Languages: German, Cantonese (minimal)

Joyce M. Turk – Animal Scientist

M.S.– Animal Science/Nutrition (1986), Cornell University; B.S.– Livestock Production, (1970), The Ohio State University.

Experience: Livestock Advisor – Sudan, Kenya, Morocco, Peru, Indonesia; Evaluation–Kenya; Extension–Philippines; Peace Corps; Vet Technician.

A.I.D.: AFR/EA – Sudan, AFR/TR/ARD, USAID/Sudan, S&T/AGR/AP.

Language: Arabic

Benjamin Waite – Plant Pathologist

Ph.D.– Plant Pathology (1961), M.S.– Entomology (1951), B.S. – Plant Pathology; all from University of California, Berkeley.

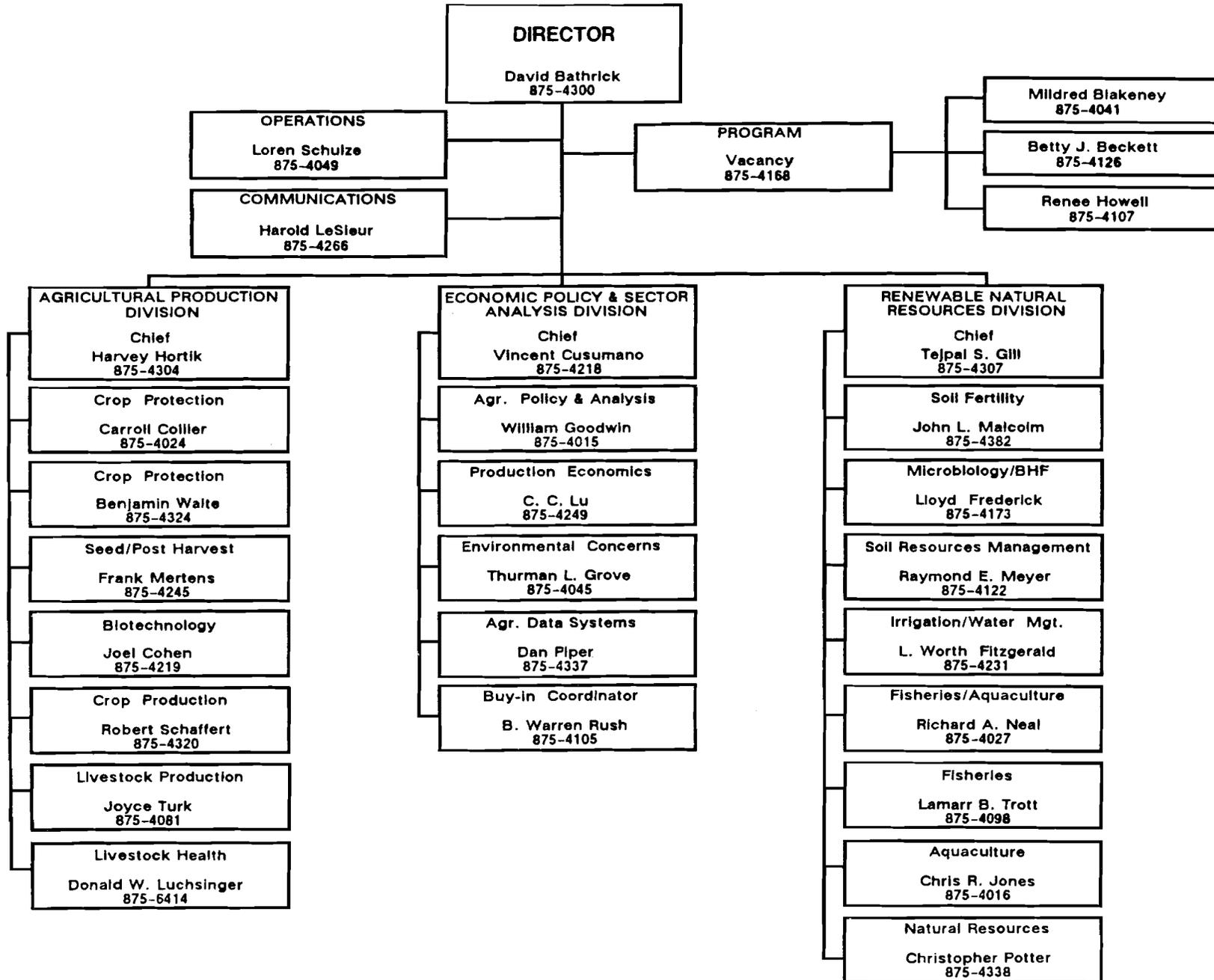
Experience: Plant Pathology Research and Horticulture; Latin American countries, Kenya.

A.I.D.: RSSA (USDA/APHIS) S&T/AGR/AP.

Languages: Spanish

S&T/AGR ORGANIZATIONAL CHART

As of 2/89



SECTION V.

AGRICULTURAL PRODUCTION DIVISION

A. CROP RESOURCES

PROJECT TITLE: Spring X Winter Wheat

PROJECT #: 931-0621
Duration: FY 86 - FY 90

COOP. AGREEM. #: PDC-0621-A-00-6057-00
Termination current agreement: 6/30/90

PURPOSE: To increase and sustain food production in developing countries with emphasis on small farms and adverse environmental constraints.

MEANS OF ACCESS: A buy-in to this project can provide: (1) short- and medium- term research and extension training on cereal production; (2) provide enhanced wheat and barley germplasm tolerant to abiotic and biotic stresses; and (3) develop in-country symposia focusing on all phases of cereal production, marketing and end product use. Services under this project may be accessed through Purchase Orders to Oregon State University for tasks costing less than \$25,000 and under a BOA for tasks costing more than \$25,000.

GEOGRAPHICAL FOCUS: Worldwide, emphasis in arid/semiarid and rainfed zones.

DESCRIPTION: The project consists of four activities: (1) collect, evaluate, enhance and disseminate wheat and barley germplasm; (2) provide short-term and graduate training; (3) insure free exchange of germplasm between developing countries and regional and international cereal improvement projects; and (4) serve as a resource center and provide symposia on cereal production.

Major accomplishments include: (1) currently, about 10 million hectares in 39 countries are growing cultivars from spring and winter wheat programs (researchers established that systematically crossed winter and spring gene pools enhances genetic variability for most agronomic traits and especially those associated with stress environments); (2) linkages established with 45 countries and 110 wheat breeding programs, with more than 7,000 advanced lines are now available for crossings; (3) eighty-seven students (50 from LDCs) have received M.S. and Ph.D. degrees; (4) a number of non-degree programs held for LDC senior scientists; (5) three in-country symposia held; and (6) newer approaches using biotechnology to enhance genetic variability to specific limiting factors in both wheat and barley disseminated.

The following documents are available for distribution on request: (1) results of the International Wheat X Spring Wheat Screening Nursery, OSU-CIMMYT-USAID, from 1973 to present; (2) fifty-one referred publications since 1980; (3) proceedings from three in-country symposia (in two languages); (4) eighty-four M.S. and Ph.D. theses since 1973; and (5) abstracts of national and international meetings.

CONTACTS FOR SUPPORT

Project Director

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PROJECT TITLE: Millet and Sorghum CRSP (INTSORMIL)

PROJECT #: 931-1254

GRANT #: DAN-1254-G-SS-5065-00

Duration: FY 79-Anticipated to be
15-25 year project

Termination Current Agreement: 12/31/90

PURPOSE: To improve the overall quality of life, both economically and nutritionally, in LDCs where sorghum and millet are principal food crops through increasing sustainable production of these crops.

MEANS OF ACCESS: A buy-in to this project can provide short, medium and long term technical support services for sustainable agricultural programs involving sorghum and millet including: variety development, water and soil management, insect and disease management, cultural practices, food quality and socio-economic studies. In addition, this CRSP is capable of designing and implementing degree training programs, managing collaborative research activities, enhancing research capability of LDC institutions and designing baseline data surveys.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: INTSORMIL is a U.S.-LDC collaborative research network which enhances the ability of U.S. and LDC institutions to alleviate constraints to sorghum and millet production, marketing and utilization through the development of appropriate and sustainable technology. INTSORMIL is working collaboratively with scientists at national research institutions in the ecogeographic zones of East, West and Southern Africa, Latin America and Asia. Major program components are sorghum and millet agronomy, breeding, economics, entomology, food quality and utilization, pathology and physiology.

Some of INTSORMIL's major accomplishments are: (1) Development of improved sorghum and millet varieties, hybrids and germplasm with higher human food quality traits, striga resistance, drought tolerance and insect and disease resistance; (2) Development of improved tillage programs, crop residue practices, and water harvesting techniques; (3) Development of insect and disease management programs; (4) Establishment of small food quality and utilization laboratories; (5) Identification of sorghum root exudate which stimulates striga germination; (6) Development of alternative food uses; and, (7) Training of over 200 LDC scientists to the MS and PhD levels in relevant aspects of sorghum and millet improvement. Upon request INTSORMIL can provide: annual reports, Sorghum Quality Laboratory Manual for West Africa, proceedings from workshops and conferences, scientific articles and technical series reports on different topics.

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PROJECT TITLE: Bean/Cowpea CRSP

PROJECT #: 931-1310

GRANT #: DAN-1310-G-SS-6008-00

Duration: FY 80- Anticipated to be
a 15-25 year project

Termination current agreement: 5/6/89

PURPOSE: To help organize and mobilize the financial and human resources available to: mount a major multi-institutional US/LDC collaborative effort of research and training related to beans and cowpeas; improve the living conditions of small farm producers in developing countries; and increase the availability of low-cost, nutritious food for the rural and urban poor.

MEANS OF ACCESS: USAID missions can access specialized services through bilateral arrangements with Michigan State University. A BOA is being negotiated between A.I.D. and MSU.

GEOGRAPHICAL FOCUS: Africa and Latin America/Caribbean.

DESCRIPTION: The Bean/Cowpea CRSP is conducting research on the major constraints to bean and cowpea production and utilization. These include:

(1) disease and insects; (2) growth and development stresses; (3) socio-cultural factors; (4) storage, food preparation and nutrition; and (5) farming systems. Short-term and degree training programs, workshops and seminars are also components of this CRSP. The role of women as producers, processors and consumers as well as in research and training is also the focus of the project.

The major accomplishments include: (1) dramatic increases in cowpea production in Senegal, (2) germplasm collection and evaluation for major bean and cowpea constraints, (3) new varieties with increased yield and multiple disease resistance, (4) low-cost seed storage technologies, (5) collection of parasites to be used in biological control of insect pests, (6) new bean varieties with improved nitrogen fixation capacity, (7) non-race specific rust resistance, and (8) new varieties with improved nutritional value and reduced firewood/fuel requirements.

The Bean/Cowpea CRSP has published annual reports, Research Highlights, newsletters, workshop and seminar proceedings and participating scientists have published numerous journal articles. US institutions include: Michigan State University, Purdue University, University of Georgia, Cornell University, University of Wisconsin, Boyce Thompson Institute, Kansas State University, University of California-Riverside, University of Illinois, University of Minnesota, University of Nebraska-Lincoln, University of Puerto Rico and Washington State University.

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PROJECT TITLE: Storage and Processing of Fruits and Vegetables

PROJECT #: 931-1323
Duration: FY 80 - FY 90

COOP. AGREEM. #: DAN-1323-A-00-5093-00
Termination current agreement: 9/30/90

PURPOSE: To conserve perishable agricultural commodities after harvest by improving LDC postharvest handling and marketing systems, to strengthen LDC institutions and staff, to implement economically sound and environmentally safe postharvest programs and to increase the University of Idaho and its Postharvest Institute for Perishables (PIP) resource base for networking with U.S., LDC, and international institutions.

MEANS OF ACCESS: Buy-ins to this project can be made through a Basic Ordering Agreement and Purchase Orders. Requests for information and advice can be made directly to the PIP Information Center (PIPIC). PIP is a subcontractor on the S&T/RD Agricultural Marketing Improvement Strategies (AMIS) project so requests for marketing research and technical assistance can be made through the AMIS buy-in mechanism. PIP also provides services through direct contracts with non-USAID organizations.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: PIP: (1) conducts adaptive research on postharvest handling and marketing problems of perishable fruits and vegetables; (2) provides technical assistance to Missions and LDC organizations; (3) trains LDC personnel; and, (4) provides printed information on the postharvest handling and marketing of perishable commodities through PIPIC.

PIP has: (1) completed over 75 technical assistance projects in 30 countries; (2) completed 12 adaptive research programs; (3) conducted 25 training workshops; and (4) supported 12 graduate students. Additionally, PIPIC has accumulated nearly 11,000 postharvest documents and has distributed 70,000 copies to nearly 900 clients in 125 countries.

Missions should recognize PIP as a resource available to help them train personnel and develop sustainable strategies to better utilize existing agricultural production. Improved postharvest handling and marketing result in greater national and individual incomes, improved nutrition, new products and markets, increased private sector development and improved welfare for LDC farmers and food handlers.

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PROJECT TITLE: Peanut CRSP

PROJECT #: 936-4048
Duration: FY 82- Anticipated to
be a 15-25 year project.

GRANT #: DAN-4048-G-SS-2065-00
Termination Current Agreement: 6/30/90

PURPOSE: To improve the availability and consumption of food, increase incomes, and maintain and enhance the natural resource base through the development of a peanut research base in both the U.S. and host countries that can bring relief to constraints to peanut production and utilization.

MEANS OF ACCESS: Missions can access specialized services through bilateral arrangements with the University of Georgia. A Basic Ordering Agreement has been negotiated and is in place between A.I.D. and the University of Georgia.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: The Peanut CRSP conducts research, in both host countries and the U.S., on the major constraints to peanut production and utilization. These include: (1) low yielding varieties; (2) mycotoxin hazards to health; (3) pest damage to crops; (4) inadequate food supplies; and (5) soil microbiological barriers. The Peanut CRSP coordinates complementary activities with the ICRISAT programs in Asia and Semiarid Tropical Africa, IDRC and ACIAR in Asia and CARDI in the Caribbean. Degree training, non-degree training, short courses, and workshops prepare host country collaborators and stimulate technology transfer.

The major accomplishments include: (1) the varietal research program released three new varieties in Thailand, one in the Philippines, one in the Caribbean, three in North Carolina with others in final stages of evaluation in Texas, Senegal, Nigeria and Burkina Faso; (2) advancements are being made toward development of varietal resistance to aflatoxin-producing fungi; (3) multi-pest and multi-location resistances to major insects and viruses have been identified in collaborative research in Philippines, Thailand, Burkina Faso, Nigeria, Georgia and North Carolina; (4) improved storage and selection for aflatoxin-free peanuts have resulted from hot water blanching; and (5) a synergistic effect with specific varieties and selected *Rhizobium* species resulted in significant yield increases due to improved nitrogen-fixation.

The Peanut CRSP has published annual reports, research publications, journal articles, workshop and seminar proceedings and the *International Arachis Newsletter* in collaboration with ICRISAT. U.S. institutions include the University of Georgia as the Management Entity, and Alabama A&M, Georgia, North Carolina State and Texas A&M as collaborating institutions in the U.S.

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**PROJECT TITLE: Agricultural Technology Research and Development
(Plant and Seed Materials)**

PROJECT #: 936-4109

CONTRACT #: BST-0829-R-AG-2216-04

Duration: FY 81 - FY 91

Termination current agreement: 7/31/91

PURPOSE: Plant introduction and material exchange; to select, locate and ship plant materials upon request to A.I.D. Missions and developing countries.

MEANS OF ACCESS: Direct contact with Project Manager or Project Director.

GEOGRAPHICAL FOCUS: Worldwide.

DESCRIPTION: This project selects, locates and ships plant materials; disseminates technical information on these materials; selects and ships correct Rhizobium inoculant with shipments of legume seeds; identifies sources and information for crop plants so that stocks can be made available on short notice. No charges are made for these services to A.I.D. Missions, Mission cooperators and American Embassy Agricultural Attache Offices.

The project has operated for 30 years under A.I.D. support. During 1983-87, over 9,800 items in 662 shipments of virtually every known economic crop have been sent to practically every developing country.

Plant shipments must conform to quarantine regulations of the importing country.

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PROJECT TITLE: Collaborative Development of Methods to Improve Cropping Systems through the Utilization of Soil Improving Legumes

PROJECT #: 936-4109

Grant #: DAN-4109-G-SS-7095-00

Duration: FY 87 - FY 90

Termination Current Agreement: 7/31/90

PURPOSE: To provide assistance and support of a program of collaborative development of methods to improve cropping systems through the utilization of soil improving legumes.

MEANS OF ACCESS: Collaborative research and development, special training programs, informational services and networking directly with the Rodale Research Center or in coordination with other centers of expertise can be arranged through direct contact with Project Director and/or Manager. Technical assistance, advisory services, in-country and regional training and technology transfer tasks can be accessed through Purchase Orders to the Rodale Research Center for tasks costing less than \$25,000 or through direct contracts to Rodale Research Center for tasks costing \$25,000 to \$100,000.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: The project consists of four activities: (1) collect and analyze legume and *Rhizobium* germplasm and assess their use for tropical and temperate gardening and cropping systems; (2) enhance institutional linkages with U.S. and host country research institutions, IARCs, PVOs, and USDA; (3) conduct a workshop on legumes and research on legume/climate/*Rhizobium* interactions; and (4) train international interns to serve as trainers of the screening methodology in their countries.

The project has coordinated activities involving soil improving legumes with host country research programs, IARCs in Africa, Latin America and Asia, and USDA. The project has received information and germplasm from IITA, CIAT, ICRISAT, CIMMYT, several national programs and U.S. sources. A workshop to develop the methodology for screening legume germplasm for use in soil improvement prepared the basis for the training of the international interns. The Rodale Research Center continues to serve as the focal point for inquiries on the use of legumes for soil improvement.

Information materials from the legume germplasm database, reports and contacts throughout the world are available upon request. Germplasm documentation collected in the Rodale Research Center database will facilitate acquisition of appropriate germplasm for legume screening for local use.

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PROJECT TITLE: Soybean Utilization and Research

PROJECT #: 936-4132

COOP, AGREEM #: DAN-4132-A-5117-00

Duration: FY 85 - FY 91

Termination Current Agreement: 12/31/89

PURPOSE: To assist private businesses and government entities in LDCs to develop, test, adapt and disseminate new soy products and soybean processing techniques with particular concern for meeting the needs of the malnourished.

MEANS OF ACCESS: Collaborative research and development, in-depth and special training programs, informational services and networking can be arranged through direct contact with Project Director and/or Manager. Technical assistance, advisory services, in-country and regional training and major technology transfer tasks may be accessed through Purchase Orders to The University of Illinois at Urbana-Champaign (UIUC) for tasks costing less than \$25,000 and under a BOA for tasks costing more than \$25,000.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: The International Soybean Program (INTSOY) headquarter at the UIUC implements the project with the goal of improving human nutrition around the world through the increased use of whole soybeans, a legume rich in protein, unsaturated oils, vitamins and minerals. INTSOY's major focus is on a three-phase utilization effort: (1) intensified research to develop new soy products and processes; (2) development of simple "how-to" manuals and equipment lists for production of soy foods on a small or large commercial scale; and, (3) on-site technical assistance in soybean utilization in LDCs.

Major accomplishments include: (1) modified extrusion and expeller equipment adapted to extract oil and produce a food grade, high protein meal for human food and/or animal feed (several countries in Asia and Africa initiated commercial use of this technology); (2) small-scale soymilk production technology improved for transfer to LDCs; (3) dissemination of technology for the processing of whole soybeans at the home or village level; (4) INTSOY expanded its capacity to analyze the economic feasibility of the newly developed technologies; and (5) soy food training is available with short courses in LDCs and non-degree and degree training at UIUC.

A complete series of technical pamphlets, reports and special publications are available for distribution. Equipment specifications for soybean processing and utilization for human and animal consumption are also available.

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**PROJECT TITLE: Collaborative Research and Special Constraints Project for
International Agricultural Research Centers**

PROJECT #: 936-4136
Duration: FY 86 - FY 90

CONTRACT #: BST-4136-P-AG-5083-00
Termination current agreement: 7/30/90

PURPOSE: To provide, as required, scientists and technological resources in the U.S. agricultural science community to the international agricultural research center (IARC) network.

MEANS OF ACCESS: This project addresses exclusively research constraints for the International Agricultural Research Centers.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: This project awards small research grants (up to \$90,000) to U.S. researchers to solve research constraints of the IARCs.

The project awarded 21 grants to 19 different universities for collaborative research with 10 IARCs. The project committee evaluates, annually, the research constraints of the IARCs and invites U.S. institutions to submit proposals which are then evaluated and graded. Research grants are awarded, subject to availability of funds, usually three to four per year. Projects are for up to three years in length and amount to not more than \$90,000. The project strengthens and increases the research network between the IARCs and U.S. institutions and familiarizes researchers with LDC research problems.

The initial research projects funded in 1986 will be completed in 1989. Research results will be available at that time.

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PROJECT TITLE: Biotechnology – Plant Tissue Culture

PROJECT #: 936-4137

COOP. AGREEM. #: DAN-4054-A-00-7081-00

Duration: FY 84 – FY 89

Termination current agreement: 12/31/90

PURPOSE: To develop stress tolerant crop germplasm, through tissue culture technologies, which will increase productivity on farms adversely affected by salinity, aluminum toxicity or drought.

MEANS OF ACCESS: Scientific expertise is available from the Tissue Culture for Crops Project (TCCP) at Colorado State University in tissue culture selection techniques, biotechnology networks and application of biotech for crop genetic manipulation. Training, from the technician to postdoctoral level, and short-term technical assistance are also available from the project.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: Hundreds of millions of acres of farm land in the developing countries are affected by various environmental stresses such as soil salinity, aluminum toxicity and drought. Most abiotic stresses are difficult to correct, so in searching towards a practical solution, A.I.D. initiated exploratory research during 1980 to determine whether crop variety characteristics could be modified to overcome stresses through 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 crops important to LDC farmers for the environmental stresses mentioned above.

Scientists at TCCP have been able to regenerate plants from stress-tolerant cell lines of many crops. In the cereals, this includes rice, sorghum, millet and wheat. In addition, regeneration techniques have been developed for tepary beans, and pigeon pea. Presently, TCCP is negotiating with collaborators for field testing of the most promising material increased from the regenerated plants.

The project sponsors an International Plant Biotechnology Network (IPBNET) which provides a newsletter, an international directory of scientists using tissue culture and organizes an annual meeting to provide state-of-the-art information on genetic manipulation of crop plants.

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PROJECT TITLE: IPM and Environmental Protection, Including Bio-control

PROJECT #: 936-4142
Duration: FY 85 - FY 90

CONTRACT #: DAN-4142-C-00-5122-00:
Termination current agreement: 9/30/90

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

MEANS OF ACCESS: Buy-ins through contracts, purchase orders, direct contracts.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: The project conducts regional seminar/workshops in pest and pesticide management, training courses in crop loss assessment, weed technology and pesticide residue analyses; assists in project planning in crop protection as related to A.I.D. country projects; conducts train-the-trainer programs in pesticide safety; and prepares environmental assessments for clearance of pesticides in country projects.

The main accomplishments of the project include: (1) conducted a Seminar/Workshop on Pest and Pesticide Management in Bangkok, Thailand, in collaboration with GTZ, FAO, IRDC and IRRI; (2) conducted Programmatic Environmental Assessments for Bont Tick Program (Caribbean), Mediterranean Fruit Fly Eradication (Central America), and Desert Locust (Africa), as well as numerous other assessments for mission funded agricultural projects; (3) provided technical backstopping for locust/grasshopper control program in Africa; (4) conducted Pesticide Disposal Studies (East Africa, South Pacific and Asia); and, (5) supported training courses in pesticide safe use, weed control, pesticide residue analysis, crop loss assessment, integrated pest management and microcomputer use in pest management.

Additionally, the project funded the *Nematology Newsletter* in cooperation with North Carolina State University.

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PROJECT TITLE: Improved Seed Production and Utilization R&D

PROJECT #: 936-4143
Duration: FY 86 - FY 93

COOP. AGREEM. #: DAN-4143-A-00-6047-00
Termination current agreement: 7/15/93

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

MEANS OF ACCESS: Collaborative research and development, in-depth and special training programs, informational services and networking arranged through direct contact with Project Director and/or Officer. Technical assistance, advisory services, in-country and regional training and major technology transfer tasks, accessed through Purchase Orders to Mississippi State University (MSU) for tasks costing less than \$25,000, and under Basic Ordering Agreement for tasks costing more than \$25,000.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: This project has five components: (1) research and development related to seed production and utilization in LDCs; (2) degree (BS and PhD) and special training programs at MSU; (3) in-country, regional and in-service training and workshops in LDCs; (4) technology transfer and informational services; (5) networking and collaboration with other projects, the IARCs, LDC institutions, and others; and (6) technical assistance on seed program/industry development including analyses of existing programs, feasibility studies, design and specification of facilities and organization structures, related extension activities and privatization.

Activities under the present project and its predecessors since 1958, had a major influence on the seed program/industry in more than 25 LDCs, and substantial influence in 10 other LDCs. Most program/industry leaders and seed specialists in LDCs received training either at MSU, or in-country and regional courses/workshops organized by MSU. Project staff have also been involved in many seed projects financed by other donors. For 30 years the project has been the main vehicle for transfer and adaptation of the essential appropriate technology for seed production, conditioning and storage in LDCs, especially those in the humid tropics.

Information materials in excess of 200 reprints, reports, special publications and handbooks available for distribution. Layout designs and equipment specifications for seed facilities of all types also available on request.

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PROJECT TITLE: Postharvest Grain Systems R&D

PROJECT #: 936-4144

CONTRACT #: DAN-4414-A-00-5095-00

Duration: FY 85 - FY 91

Termination current agreement: 10/01/85

PURPOSE: The purpose of the project is to assist the Food and Feed Grains Institute (FFGI) of Kansas State University (KSU) in maintaining its resource base--and in collaboration with U.S., LDCs, and international institutions--to reduce grain losses after harvest by: (1) improving LDC postharvest grain systems, (2) strengthening LDC institutions and staff and (3) implementing economically sound and environmentally safe programs in postharvest systems.

MEANS OF ACCESS: Access to technical expertise available under this project may be accomplished by buy-ins to the Basic Ordering Agreement. Purchase orders or direct contracts can also be used to access this source of expertise for tasks costing less than \$25,000.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: The major components of the project are: (1) applied research related to postharvest grain systems in the LDCs; (2) provision for LDC graduate students to be involved in research; (3) technical advice and assistance on postharvest grain systems; (4) collect and distribute materials on postharvest problems; (5) documentation services (PHDS) on postharvest grain systems; (6) academic training guidance at KSU; (7) in-country and on-campus short courses, workshops and seminars; and, (8) strengthening existing and new relationships under the network program.

Major accomplishments of the project include: 21 current research projects, 14 M.S. and Ph.D. graduates, 95 participants trained in Grain Storage and Marketing, 25 participants trained in-country, collaborative postharvest loss research project completed in Costa Rica, improvement in operations of Belize Marketing Board, and grain policy adjustment in Costa Rica.

A complete series of technical assistance, research and special reports in postharvest grain systems are available to AID missions on request. Also available on request is a comprehensive data base of postharvest grain systems technical information.

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B. LIVESTOCK RESOURCES

PROJECT TITLE: Vertebrate Pest Management

PROJECT #: 936-4173

CONTRACT #: DAN-4173-X-AG-6001

Duration: FY 86 - FY 91

Termination current agreement: 12/31/90

PURPOSE: To increase the available food supply in developing countries by reducing preharvest and postharvest losses to vertebrate pests utilizing safe, effective and economical control methods which are suitable for traditional farmers and acceptable in the broader context of agricultural development.

MEANS OF ACCESS: Buy-ins through S&T/AGR "ribbon" PASA purchase orders. USAID missions can access the specialized services through bilateral arrangements with the implementing institution via the S&T/AGR PASA.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: This project provides problem definition, technical assistance, training, research and networking in vertebrate pest management. This is accomplished via a RSSA with the Denver Wildlife Research Center (DWRC) of the USDA Animal and Plant Health Inspection Service. Through its ties with ST/AGR, DWRC is able to extend its expertise worldwide. Research emphasis is aimed at developing new and or modifying existing control measure applicable within the existing agricultural production modes. Special emphasis is given to environmentally sound methods appropriate for small farmers. Both chemical and non-chemical approaches are evaluated.

Recent DWRC accomplishments include: (1) 71% reduction of rat damage to wheat in Bangladesh at a cost-benefit ratio of 1:30; (2) graduate training in vertebrate pest management of 40 scientists from 15 countries; (3) demonstration of bird-scaring reflecting tape to reduce bird damage to cereal crops; (4) development of techniques (fluorescent particle markers, radiotelemetry, and trace element profiles) to survey quelea bird populations and improve national control efforts.

Numerous publications have resulted from this project such as: (1) Fall, M.W. Rodents in Tropical Rice; (2) Fiedler, L.A. Vertebrate Pest Control Training Manual; (3) Jaeger, M.M., et. al., Evidence of Itinerant Breeding of the Red-billed; (4) Quelea in the Ethiopian Rift Valley; and, (5) Bruggers R., et al., Impact of fenthion sprays on non-target birds during quelea control in Kenya.

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PROJECT TITLE: Small Ruminant CRSP

PROJECT #: 931-1328
Duration: FY 78 - Anticipated
to be 20 year project

GRANT #: DAN-1328-G-SS-4093-00
Termination Current Grant: 9/30/90

PURPOSE: To increase production of meat, milk and fiber from sheep, goats, and alpacas owned by smallholders in LDCs.

MEANS OF ACCESS: A buy-in through the Basic Ordering Agreement of this project will provide technical advisory services for: (1) designing, implementing and evaluating projects concerned with health, production or marketing of small ruminants; (2) co-sponsoring collaborative research to identify and assess possible advantages for small ruminants; and, (3) developing and conducting in-country training programs.

GEOGRAPHICAL FOCUS: Worldwide.

DESCRIPTION: The SR-CRSP, in which the University of California at Davis is the implementing organization with eight other universities (Univ. of Missouri, Utah State, Texas Tech., Texas A&M, Colorado State, Montana State, Washington State, and North Carolina State) and Winrock International as subgrantee institutions. The project oversees a multidisciplinary program that investigates the biological and socio-economic elements of agricultural production in four countries: Peru, Indonesia, Kenya and Morocco. Linkages have been established: (a) with more than one national agency within each country, and (b) between U.S. and LDC institutions in research components involving animal nutrition, physiology and health, range management, sociology, economics and systems analysis.

Accomplishments include development of dual-purpose (meat and milk) goats in Kenya; inclusion of green legume foliage in livestock rations in Indonesia; development of selenium and Vitamin E treatment of lambs in Morocco; a vaccine against contagious caprine pleuropneumonia in Kenya; and development of diagnostic tests and control procedures for pulmonary adenomatosis and progressive pneumonia of sheep in Peru.

Key publications include annual reports from each country; a reference book entitled, *Genetics of Reproduction in Sheep*, over 50 technical reports, a quarterly newsletter, listing of research publications, technical packages for extension workers and a program information brochure.

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PROJECT TITLE: Host Resistance – Integrated Tick Control

PROJECT #: 936-4083

GRANT #: DAN-4083-G-SS-3063-00

Duration: FY 83 – FY 89

Termination current agreement: 8/31/89

PURPOSE: To develop a vaccine against ticks which are vectors of parasites causing diseases such as Heartwater and Babesiosis in livestock. To establish a herd of tick resistant cattle for future use as breeding stock for farmers.

MEANS OF ACCESS: USAID missions can access the services of researchers and trainers through buy-ins or bilateral arrangements with the implementing institution, the International Center of Insect Physiology and Ecology, ICIPE.

GEOGRAPHICAL FOCUS: East Africa

DESCRIPTION: The research component of this project is committed to development of: (1) lines of cattle breeds having natural resistance to ticks; (2) improved measures for the control of ticks in the environment, thus reducing need and use of acaricides; and, (3) vaccines which protect livestock against ticks. The socio-economic component is developing valuable implementation data.

The main accomplishments of the project include: (1) breeds and lines of cattle naturally resistant to tick infestation are being genetically characterized in an attempt to identify the genetic component of tick resistance; (2) the descriptive phase of the ecological program is well advanced on Rusinga Island in Lake Victoria; (3) development of tick vaccine is progressing; (4) tick midgut and solubilized membrane proteins have been tested in rabbits and sheep with some protection induced; and (5) further studies in cattle are being done.

Key publications: ICIPE has linkages with Kenya and other collaborating African states as well as researchers abroad who readily and eagerly exchange data and information relating to research on ticks.

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**PROJECT TITLE: Improved Animal Vaccines Through Biotechnology:
Phase I, Rinderpest**

PROJECT #: 936-4178(a)
Duration: FY 86 - FY 89

COOP. AGREEM. #: DAN-4178-A-00-6040-00
Termination current agreement: 8/31/89

PURPOSE: To develop and test a rinderpest vaccine in a recombinant vaccinia vector that is comparable to the Plowright vaccine in terms of safety and efficacy but which is more heat stable.

MEANS OF ACCESS: Once tested in Africa, access to the vaccine can be obtained through buy-ins or direct contracts. Training in molecular biology at the doctoral or postdoctoral level can be undertaken under Dr. Yilma's direction at UC/Davis.

GEOGRAPHICAL FOCUS: Regional - Africa and ANE

DESCRIPTION: More than 30 countries are involved in the current Pan African Rinderpest Campaign. The severity of the epidemic has focused attention on the need for a thermostable vaccine that eliminates the need for a cold chain. Through this S&T/AGR project, a new vaccine for rinderpest will be developed that is not only heat stable, but will be easier to administer in the field, easier to produce and provide the same degree of protection as the conventional Plowright vaccine.

Accomplishments to date include the development of the new recombinant vaccine, followed by testing it on cattle held in containment at Plum Island. Results of this study confirmed the ability of the new vaccine to provide complete protection against rinderpest. In addition, the training component of the project has successfully involved postdoctoral research by a Kenyan scientist.

The next portion of the project involves testing the vaccine on cattle held in containment in Africa. At this point, a range of countries and missions are being considered. Host country and mission approval, along with export approval from APHIS, will be needed prior to conducting this experiment.

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**PROJECT TITLE: Improved Animal Vaccines through Biotechnology:
Phase II, Anaplasmosis/Babesiosis**

PROJECT #: 936-4178(b)
Duration: FY 86 - FY 92

COOP. AGREEMENT #: DAN-4178-A-00-7056-00
Termination current agreement: 9/30/92

PURPOSE: To apply new biotechnologies towards the development of a vaccine which will provide sterile immunity in cattle to two hemoparasitic diseases, anaplasmosis and babesiosis.

MEANS OF ACCESS: Buy-ins to this project could provide for services in epidemiology, veterinary medicine, biotechnology and vaccine development. It is estimated that missions, bureaus and other AID/W offices will request assistance for training activities, technical assistance and operational research.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: Phase II of the vaccine project is directed towards the development of genetically engineered vaccines using vaccinia virus against anaplasmosis and babesiosis. This phase provides funds for (1) epidemiologic research, vaccine development and testing of the newly developed vaccine on a limited number of animals under contained conditions; (2) training host country scientists at the technical, graduate and postdoctoral level and provide in-service and on-the-job training to technicians and scientists; and (3) establishing a network of information exchange among participating scientists in both developed and developing countries.

The major accomplishments of the project are the formulation of the Vaccine Research Network and the completion of an informational brochure describing the project. Three universities are implementing the project's training and research. The University of Florida has responsibility for the Asia/Near East region, Washington State University for the Africa region and the University of Missouri for Latin America and the Caribbean.

The first year of Phase II involves vaccine development by insertion of genes encoding for surface antigens of both diseases into vaccinia virus. Disease diagnosis and epidemiology will lead toward technologies appropriate for use in the field.

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SECTION VI.

RENEWABLE NATURAL RESOURCES MANAGEMENT DIVISION

A. SOIL AND WATER

PROJECT TITLE: International Fertilizer Development Center (IFDC)

PROJECT #: 931-0054

GRANT #: DAN-0054-G-SS-5043-00

Duration: FY 75 - Continuous

Termination current agreement: 6/30/90

PURPOSE: To assure farmers of developing countries a dependable supply of better fertilizers at lower cost.

MEANS OF ACCESS: Any service, technical assistance, training, feasibility study, process or product development and policy counselling, directly related to the core grant can be accessed through a Basic Ordering Agreement. Small activities can best be covered by a purchase order. Large activities in which USAID wishes to exert direct control should be under contract.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: IFDC is conducting research, development and providing assistance in fertilizer production and use. It is a clearinghouse of information on raw materials, processes, products, trade, supply and demand. Twelve or more training courses annually cover manufacturing and distribution management, quality control, pollution control, dealership, agronomic research and extension demonstrations. IFDC scientists characterize phosphate ore and recommend processing and use. The project staff assist in project design, and provide guidance on policies relating to mining, processing, marketing, including privatization, transportation tariffs and taxes. They also evaluate and recommend modification of practices relating to subsidies, credit, profit margins and levels of potential and actual returns on investment.

Among IFDC's most notable achievements are: (1) privatization of fertilizer distribution in Bangladesh; (2) achieving a 30 percent increase in factory output with no major capital expense in Brazil; (3) an equity study in India which showed that small farmers using fertilizer gained proportionately more than their neighbors with larger farms; and (4) identifying phosphate rock in Colombia suitable for use by local industry; and (5) demonstrating the same rice yield could be obtained with half as much nitrogen fertilizer through proper placement of fertilizer in well puddled soils.

Especially useful publications are the list of training courses, IFDC Publication Catalog and Fertilizer Manual published under UNIDO sponsorship.

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PROJECT TITLE: Soil Management Support Services (SMSS)

PROJECT #: 931-1229

PASA #: DAN-1229-X-AG-7051-00

Duration: FY 79 - FY 89

Termination current agreement: 8-30-89

(A new project is under development to continue activities)

PURPOSE: To help conserve and manage vital soil resources of the developing countries.

MEANS OF ACCESS: A buy-in to this PASA with the Soil Conservation Service (SCS) of USDA can provide short-term technical advisory services for: (1) designing, evaluating and backstopping programs and projects concerned with soil conservation, land resource inventories and soil surveys; and, (2) developing and conducting training programs in soil resources.

GEOGRAPHICAL FOCUS: Worldwide.

DESCRIPTION: Project components include: (1) research to improve soil classification systems for more effective soil-based technology transfer; (2) technical assistance to improve developing country programs in soil survey, land evaluation, laboratory capability and database management; (3) training for developing country scientists and technicians in soil resource inventories, soil analysis, soil survey methodology and soil management; (4) information dissemination through technical publications, guidelines and computer assisted programs in soil resource management.

Most notable accomplishments are: (1) a common language for soil-based agrotechnology transfer accepted by more than 30 countries; (2) institutional strengthening and training for soil research and soil survey capability, achieved in at least one country of each region; (3) technical assistance, provided to more than 50 countries; and, (4) short-term training provided to more than 900 developing country scientists.

The Soil Conservation Service has provided broad-based technical support and expertise to this project and has successfully completed bilateral projects in soil and water conservation in a number of countries. Technical publications and guidelines are available through SMSS/SCS for all phases of soil and water conservation programs. Specific publications of interest include: (1) Bibliography of Soils of the Tropics, 5 volumes; (2) Soil Moisture Regimes for all regions, 4 volumes; (3) Keys to Soil Taxonomy in 5 languages; and, (4) Agrotechnology Transfer Newsletter.

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PROJECT TITLE: Soil Management CRSP - (TropSoils)

PROJECT #: 931-1311
Duration: FY 81 - FY 89

GRANT #: DAN-1311-G-SS-6018-00
Termination current agreement: 9/24/89

PURPOSE: To discover or identify and adapt soil management practices which are agronomically, economically and environmentally sustainable in developing countries.

MEANS OF ACCESS: Services which relate directly to the research under this project are accessible through a Basic Ordering Agreement with North Carolina State University. Experts from the four cooperating institutions--University of Hawaii, Texas A & M University, Cornell University and NCSU--are available under the agreement.

GEOGRAPHICAL FOCUS: Tropics worldwide.

DESCRIPTION: The research and assistance related to that research applies to soil management in three agroecological zones: the humid tropics, wet/dry acid tropical savannas and semiarid tropics. Research or technical assistance may be supplied in intensive commercial farm management, low input agriculture, legume adaptation, degraded pasture reclamation, alley cropping, agroforestry, control of soil acidity and aluminum toxicity, soil analysis and fertility recommendation and project planning and design.

Yields in Peru have been sustained for more than forty crops since 1972 with adequate inputs of lime, fertilizer, herbicides and mechanical cultivation.

Low input agriculture, with maximum recycling of all residues can sustain yields for three to five crops following slash and burn clearing. A one year kudzu fallow can control weeds and restore fertility for at least two additional crops. An expert system has been developed to predict liming needs. A Fertility Capability Classification system devised will indicate land use and management options. A simple system to encourage natural regeneration of Sahelian forest has been found and adopted by the national forest program in Niger. A legume cover crop which will fix 170 kg of nitrogen per hectare has proven successful in Brazil. Wholly unsuspected aluminum toxicity was found a major constraint to water use efficiency in Niger. In Indonesia farmer acceptance of rotations was made possible by matching ethnic preferences.

Progress reports, reprints of journals, and computers program to guide liming, ACID4, and for Soil Fertility Capability Classification are available.

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PROJECT TITLE: Technology for Soil Moisture Management (TSMM)

PROJECT #: 936-4021

PASA #: DAN-4021-X-AG-7020-02

Duration: FY 81 - FY 90

Termination current agreement: 9/29/90

PURPOSE: To aid developing countries to do diagnostic analyses of their soil moisture problems for crop production, and to develop solutions to these problems through research and technology transfer.

MEANS OF ACCESS: A buy-in to this PASA with the U.S.D.A. can provide short-term technical advisory services for: (1) designing, evaluating and backstopping programs and projects concerned with dryland agricultural systems; (2) developing and conducting collaborative research on soil and water management constraints ; and, (3) economic analysis of soil and water management technologies in production systems.

GEOGRAPHICAL FOCUS: Worldwide in semiarid and subhumid regions.

DESCRIPTION: The project provides technical assistance for improving investment decisions in the development of dryland and rainfed agriculture. The overall objective is to maintain and improve the soil and water resource base for short- and long-term utilization and to improve output and income in crop and livestock production systems. The major approach is to integrate agroclimatic, soil, agronomic and economic data for assessment and analysis of economically, technically and environmentally viable agricultural systems and related policy and program planning options.

Major accomplishments include: (1) databases of current in-country research information in soil and water management for Jordan and for NE Thailand; (2) recommendations for research in soil and water management systems in three regions, based on regional workshops; (3) development of agroclimatological analyses and synthesis of improved cropping strategies in the Sahel for risk reductions; and, (4) development of whole farm models and economic analysis of technological inputs for improved investment decisions in rainfed systems.

The Agricultural Research Service (ARS) and Economic Research Service (ERS) provide broad-based technical support and expertise to this project. Through cooperative arrangements with Title XII universities involved in bilateral projects in developing countries, networks are being developed for collaborative research and exchange of information on dryland agricultural systems management. Scientific linkages are also being established for initiating research on wind erosion in West Africa.

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PROJECT TITLE: International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT)

PROJECT #: 936-4054
Duration: FY 87 - FY 92

COOP. AGREEM. #: DAN-4054-A-00-7081-00
Termination current agreement: 8/31/92

PURPOSE: To provide decision-makers at the national and farm levels with easy access to crop models and expert systems to evaluate various options for sustainability in agriculture.

MEANS OF ACCESS: A buy-in to this project can provide technical services for: (1) training in the use of a computerized Decision Support System for Agrotechnology Transfer (DSSAT) for predicting outcomes of alternative strategies in agriculture; and, (2) calibrating DSSAT for simulating agricultural performance under local situations.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: IBSNAT has developed a computerized decision support system for agrotechnology transfer consisting of a natural-resource data-base management system, crop simulation models, expert systems and application programs to enable decision makers to recommend reliable alternatives for solving problems. DSSAT is capable of simulating the performance of new crops, products and management practices for 10-50 years to assess their suitability for sustainable agriculture. DSSAT is currently being used in Thailand, Taiwan, Venezuela, and the U.S.A., one regional center (CATIE) and four IARC's (ICRISAT, CIAT, IRRI and ICARDA) for: (i) assessing risk of adopting new practices in rainfed agriculture, (ii) matching germplasm to new environments, (iii) coupling crop protection models to crop models for estimating yield loss from pest damage, and, (iv) assessing economic feasibility of alternative practices.

This system has been adopted by an international environmental project called Predictive Assessment Network for Ecological and Agricultural Responses to Human Activities (PAN-EARTH). PAN-EARTH is to characterize environmental stresses that can be globally experienced due to nuclear war and to predict their effects.

Available IBSNAT material include software on DSSAT AND CROP MODELS (5), and a number of technical and other publications.

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PROJECT TITLE: Water Management Synthesis II (WMS-II)

PROJECT #: 936-4127

CONTRACT #: DAN-4127-C-00-2086-00

Duration: FY 82-FY 88

Termination current agreement: 12/28/88

(A follow-on project on water resource management is being developed)

PURPOSE: To improve the capabilities of host-country institutions to bring about the increased productive performance of irrigated agriculture, through better water management and the more effective operation and maintenance of their irrigation systems.

MEANS OF ACCESS: Through buy-ins the project can provide missions and host-countries with: (1) technical assistance in the areas of project design, monitoring and evaluation, sector surveys, studies and analyses; (2) development and implementation of short-term, in-country training courses related to on-farm and main-systems operation and management, diagnostic analysis, policy and strategy development; (3) technology transfer and information exchange, including the organization of workshops and conferences as well as preparation and dissemination of reports, manuals, handbooks and other publications; and (4) special studies into selected problem areas, including both short and long-term research efforts.

GEOGRAPHIC FOCUS: Worldwide

DESCRIPTION: The WMS-II project deals with irrigation problems treating them as an interrelated set of socio-technical issues, utilizing an inter-disciplinary approach in both identifying and addressing those problems. Major areas of concern include: (1) professional development to strengthen the capabilities and bring about greater cooperation and coordination among those national institutions responsible for irrigation development and improvement; (2) encourage and bring about the increased participation of water users in the operation and maintenance of the systems that serve them; and (3) stimulate the adoption and use of sound water management practices which will result in the more efficient allocation and use of irrigation water. WMS-II is being implemented by the Consortium for International Development, which is composed of 12 Western U.S. universities.

Major accomplishments to date include: (1) response to 112 assistance requests: 16 Sector Surveys and Strategy Reviews, 18 Project Papers, PIDs and Feasibility Studies, 12 Diagnostic Analysis Workshops, three joint field studies, 13 Training Courses, 19 Research Studies and Investigations, 27 special purpose TAs and four evaluations. These requests involved 32 different missions and host governments.

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PROJECT TITLE: Improved BNF Through Biotechnology

PROJECT#: 936-4177

COOP. AGREEM. #: DAN-4177-A-00-6035-00

Duration: FY 86 - FY 96

Termination current agreement: 09/29/91

PURPOSE: To enable developing country farmers to increase production of high protein crops with less dependence on nitrogen fertilizers.

MEANS OF ACCESS: A buy-in to this project can provide short- and long-term technical services for: (1) designing, implementing and evaluating programs and projects related to the use of biological nitrogen fixation technologies in low-input sustainable agricultural projects; (2) developing and conducting in-country and regional training programs for extension workers, technicians and commercial producers; (3) providing high quality legume inoculants and rhizobial cultures for tree, grain and forage legumes; and (4) co-sponsoring and participating in collaborative research for in-country problem solving.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: The training, research, and outreach components of NifTAL (Nitrogen Fixation and Tropical Agriculture Legumes) are designed to achieve low-input sustainable development in agriculture and forestry: 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 inoculants.

The major accomplishments of NifTAL include: (1) establishing inoculant production capability in Zambia and Thailand; (2) assisting inoculant producers in Bangladesh, Burma, Egypt, Indonesia, Morocco, Pakistan and Sri Lanka; and (3) training in-country workers and PVO's in implementation of BNF technologies.

Publications and BNF resource materials are available upon request. South and South-East Asia regions are serviced from NifTAL's BNF Resource Center in Bangkok, Thailand.

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B. FISHERIES AND AQUACULTURE

PROJECT TITLE: Pond Dynamics CRSP

PROJECT #: 936-4023

GRANT #: DAN-4023-G-SS-2074-00

Duration: FY 82 - FY 90

Termination current agreement: 8/31/90

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.

MEANS OF ACCESS: Short-term services totaling less than \$25,000 can be accessed through a purchase order from the Mission directly to Oregon State University.

A Basic Ordering Agreement is in place through which short- and medium-term services can be provided through buy-ins. Buy-ins can be used to provide training, research assistance or aquaculture problem-solving research related to the research thrusts of the program.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: 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.

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, Thailand and Honduras.

Research progress is being made 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; and (4) improve the efficiency of pond culture systems.

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

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PROJECT TITLE: Fisheries Development Support Services (FDSS)

PROJECT #: 936-4024
Duration: FY 82-FY 91

COOP. AGREEM. #: DAN-4024-A-00-2072
Termination current agreement: 6/30/92

PURPOSE: To provide technical assistance, training, and information to AID and LDCs regarding fisheries development, especially relating to living marine resources.

MEANS OF ACCESS: A buy-in to this cooperative agreement with the University of Rhode Island is available through a Basic Ordering Agreement.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: Project components include assistance, training, and research in four established priority areas: fisheries management and resource utilization, postharvest losses, mariculture, and socio-cultural factors. Training and assistance can be provided on a long- or short-term basis. Degree training can be at all levels, including programs in economics, sociology, fisheries, oceanography, or biological sciences.

Major accomplishments include: (1) research on fisheries in Latin America and West Africa; (2) training of fisheries researchers and administrators from Asia, Africa, Latin America, and the Near East, with group training for Oman, Philippines, and Guinea Bissau; (3) assistance to USAID/Djibouti in PP development and evaluation; (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 proper fisheries management; (6) preliminary investigation of portunid crab resources in coastal and estuarine waters of Ecuador; and (7) research on nutritive value of brine shrimp as larval fish food in aquaculture.

Specific publications include postharvest fishery losses, evaluating the role of fishermen's cooperatives in developing countries. Videos are available on postharvest fishery losses, mariculture and the role of women in fisheries development.

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PROJECT TITLE: Fisheries and Aquaculture Technical Assistance

PROJECT#: 936-4109

RSSA #: BST-4109-R-AG-1085-01

Duration: FY 81 - FY 91

Termination current agreement: 7/31/91

PURPOSE: To provide expertise in a wide range of development needs related to coastal marine fisheries and aquaculture.

MEANS OF ACCESS: S&T/AGR can provide the service of experts in fisheries and related disciplines on a short-term basis as requested by Regional Bureaus, Missions and Host Country governments.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: This activity was initiated in 1976 through a Resources Services Support Agreement with the National Oceanic and Atmospheric Administration and National Marine Fisheries Service. This RSSA provides long-term assistance in fisheries planning and development and project identification in West Africa, the Caribbean, and Asia. It also provides continued oversight assistance of S&T/AGR fisheries projects.

Future plans call for assistance in the identification and development of fisheries projects. Areas that might receive attention in new fisheries projects developed for Southeast Asia and elsewhere include: (1) the problems of coastal communities that depend on small-scale fisheries for their livelihood; (2) the problem of postharvest loss in fishery products; (3) assisting developing countries in establishing effective management control over the living marine resources within their exclusive economic coastal zones; and, (4) environmental impact assessment and coastal zone management aspects of fishery resources, habitats and small-scale fisheries.

The following short-term outputs are available: (1) surveys and studies of A.I.D. needs in fisheries development assistance; (2) project assistance reports; (3) project and proposal evaluation reports; and, (4) country by fishery status files.

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PROJECT TITLE: Fisheries Stock Assessment CRSP

PROJECT #: 936-4146

GRANT #: DAN-4146-G-SS-5071-00

Duration: FY 86 - FY 90

Termination current agreement: 6/30/90

PURPOSE: To improve analytical and sampling methodology for assessment of the size and sustainable yields of tropical fish populations.

MEANS OF ACCESS: A buy-in to this cooperative agreement with the University of Maryland is available through a Basic Ordering Agreement.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: The project will develop specific approaches to assessing multispecies fish stocks in the marine tropical environment, emphasis will be on developing techniques for assessing the stocks, not actually conducting the assessment. The project addresses: (1) assessment of current stock determination techniques (mostly temperate); (2) development of expert systems for assessing best methods of stock determination; (3) determination of improved methods for aging of tropical fish; and, (4) development of improved methods for sampling multispecies fisheries in the tropics.

Major collaborators are the universities of Maryland, Rhode Island and Washington. Host countries are Costa Rica and the Philippines.

Major accomplishments include: (1) the University of Rhode Island has developed a first stage microcomputer model for tropical fish stocks; (2) two workshops on multispecies stock determination in developing countries (at University of Washington and in conjunction with 1988 American Fisheries Society in Toronto); (3) aging of tropical fish through microline reading of otoliths; (4) development of hydroacoustic measurements of shallow water fish stocks in Costa Rica; and, (5) development of recruitment models at the University of Maryland.

Publications include 37 working papers on many aspects of fisheries stock assessment, plus a number of publications in peer-reviewed journals.

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PROJECT TITLE: Reproductive Studies on Milkfish

PROJECT #: 936-4161

COOP. AGREEM. #: DAN-4146-A-00-4055-00

Duration: FY 84 - FY 90

Termination current agreement: 1/14/90

PURPOSE: To carry out research on milkfish in Southeast Asia and the Pacific.

MEANS OF ACCESS: Short-term services totaling less than \$25,000 can be accessed through a purchase order from the missions directly to the Oceanic Institute.

A Basic Ordering Agreement is in place through which short- and medium-term services can be provided through buy-ins. The latter can be used to provide LDC training, and technology transfer on marine fish reproduction and marine fish hatchery methods.

GEOGRAPHICAL FOCUS: Worldwide.

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

Research is directed toward two improvements in the methods for culturing milkfish: (1) maturing adult fish to spawning condition in captivity and (2) reducing the mortality of larvae during culture. 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. Principal involvement is in Taiwan, the Philippines, and Indonesia. Exchange of scientists, training and technology transfer are included.

Publications describing the state-of-the-art of milkfish farming and reviewing progress on control of reproductive processes of milkfish are available.

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PROJECT TITLE: Aquaculture Research and Support

PROJECT#: 936-4180
Duration: FY 88 - FY 93

COOP. AGREEM. #: DAN-4180-A-00-8008-00
Termination current agreement: 12/31/92

PURPOSE: To backstop aquacultural development in LDC's and to research and extend appropriate new technologies in fish culture.

MEANS OF ACCESS: Short-term services totaling less than \$25,000 can be accessed through a purchase order from the Mission directly to Auburn University. Additionally, a Basic Ordering Agreement is in place through which short- and medium-term services can be provided through buy-ins. The latter can be used to provide a wide range of information, extension, training, project development, technical backstopping and evaluation services related to freshwater aquaculture and freshwater fisheries.

GEOGRAPHICAL FOCUS: Worldwide

DESCRIPTION: Buy-ins may be used to provide assistance as follows:
(1) library and information services; (2) feasibility studies leading to the development of aquaculture projects; (3) technical assistance in hatchery operation, pond construction, pond management, fish nutrition and feeds, disease control and integrated aquaculture-agriculture; (4) impact studies and evaluations; and, (5) training courses at Auburn (graduate education in aquaculture) and in-country.

A highly competent capability has been developed at Auburn University for education, research, technology transfer and specialized training in aquaculture. Auburn has been the lead U.S. institution for freshwater aquaculture training and development for the last decade.

Hundreds of technical and scientific publications are available including a recent set of extension materials with simple explanations of advanced aquacultural practices.

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SECTION VII.

ECONOMIC POLICY AND SECTOR ANALYSIS DIVISION

PROJECT TITLE: Agricultural Policy Analysis Project (APAP)

PROJECT #: 936-4084
Duration: FY 88 - FY 93

CONTRACT #: DAN-4084-Z-00-8034-00
Termination of Agreement: 12/31/93

PURPOSE: To increase developing country decision-maker's knowledge and understanding about how key economic policies affect agricultural and rural sector development.

MEANS OF ACCESS: An S&T/AGR core-supported project with provisions for buy-in or budget transfer to provide short- and medium-term technical advisory services for: (1) designing, implementing and evaluating programs and projects concerned with agricultural policy analysis capacity building; (2) co-sponsoring collaborative research to identify and assess relevant policy issues and providing assistance to resolve them; and (3) training of trainers, developing and conducting in-country and regional training programs.

GEOGRAPHICAL FOCUS: Worldwide.

DESCRIPTION: APAP's Phase II will employ six activities including: (1) policy project design, evaluation and implementation assistance; (2) agricultural policy consultant roster; (3) collaborative agricultural policy research studies; (4) policy analysis guidelines and methodological tools; (5) training and workshops; and, (6) dissemination and networking.

The major accomplishments of APAP's phase I include: changes in rice policies in Liberia and Madagascar; elimination of fertilizer subsidies in Niger; use of PL-480 food commodity assistance to alleviate short-run impacts of the economic adjustment program in Tunisia; building policy analysis capability in the Dominican Republic; relaxing controls over private sector grain trade in Togo; reorganization of wholesale marketing of fruits and vegetables in Jordan; and divestiture of government parastatal monopolies in Mali and Egypt.

Abt Associates, Inc. will implement APAP's phase II in collaboration with Harvard Institute for International Development (HIID); Food Research Institute, Stanford (FRI); North Carolina State University (NCSSU); Abel, Daft, Earley (ADE); and International Science and Technical Institute (ISTI).

Documents available on request include: Ag. Policy Analysis Guidelines, (1986); Ag. Policy Analysis: Tools for Economic Development, (1988); Manual for ARDOs; Staff Papers on diverse ag. policy topics; and microcomputer tools.

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