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Annual Report

October 1, 1986-September 30, 1987

for the

INTEGRATED PEST MANAGEMENT AND ENVIRONMENTAL PROTECTION PROJECT

Project No. 936-4142

AID Contract No. DAN-4142-C-00-5122-00

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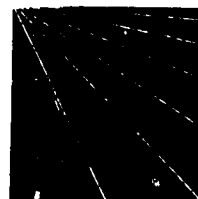
U.S. Agency for International Development

Bureau of Science and Technology Office of Agriculture

by the

Consortium for International Crop Protection

June 1988



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FOREWORD

This report summarizes the activities performed under the Integrated Pest Management and Environmental Protection Project for the period October 1, 1986 through September 30, 1987. The Project, funded centrally by AID/S&T/AGR, and augmented through funding from AID Missions and Offices, provides crop protection assistance, training, research and networking. What appears in this report is a brief summary of activities. Detached reports and any resulting publications concerning project activities are maintained in the office of the Consortium for International Crop Protection. Please write the Consortium for a list of reports and publications available.

- A. L. Steinhauer
Project Director

ACRONYMS

- AFR - African Bureau (of AID)
- AID - United States Agency for International Development
- AID/S&T/AGR - AID Bureau of Science and Technology, Office of
Agriculture
- AID/W - AID/Washington
- APHIS - Animal and Plant Health Inspection Service
- ARP - agricultural research project
- ARS - Agricultural Research Service (U.S.)
- ASEAN - Association of Southeast Asian Nations
- CAPMED - Central American Program for Medfly Eradication
- CATIE - Centro Agronomico Tropical de Investigacion y
Ensenanza
- CENTA - Centro Nacional de Tecnologia Agropecuaria/National
Agricultural Technology Center
- CICP - Consortium for International Crop Protection
- CILSS - Comité Interétats de Lutte Contre la Sécheresse au Sahel/
Interstate Committee for Drought Control in the Sahel
- ECLO - Emergency Center for Locust Operations (FAO)
- FAO - Food and Agriculture Organization of the United Nations
- HMG -
- ICIPE - International Centre for Insect Physiology and Ecology
- ICTA - Instituto de Ciencias y Tecnología Agrícola/Science and
Agricultural Technology Institute
- IEE - initial environmental examination
- IICA - Instituto Interamericano de Cooperacion para la
Agricultura

INIPA - Instituto Nacional y Investigacion y Promocion
Agropecuaria

IPC - integrated pest control

IPM - integrated pest management

IPPC - International Plant Protection Center

IRRI - International Rice Research Institute

IWSS - International Weed Science Society

LA - Latin America(n)

LDC - less developed country

MOA - ministry of agriculture

MOSCAMED - Mediterranean Fruit Fly Eradication Program, Guatemala
and Mexico

MOU - memorandum of understanding

NARP - National Agricultural Research Project

OFDA - Office of Foreign Disaster Assistance

OSU - Oregon State University

PL480 - Public Law 480

PM - person month

PPM - Pest and Pesticide Management

ROCAP - AID's Regional Office for Central American Programs

SENAPIC - Servicio Nacional de Proteccion Integrado de
Cultivos

UMCP - University of Maryland at College Park

UMI - University of Miami

UMN - University of Minnesota

UNDP - United Nations Development Program

USAID - U.S. Agency for International Development (missions)

USDA - U.S. Department of Agriculture

I. PROJECT BACKGROUND AND ORGANIZATION

A. BACKGROUND

The United States Agency for International Development (AID) sponsored several pest management-related projects in cooperating developing countries since the mid-sixties. AID's most recently signed contract, with the Consortium for International Crop Protection (CICP) in 1985, entails conducting the Integrated Pest Management and Environmental Protection Project, a 5-year, multi-disciplinary program in crop pest and pesticide management, Project No. 936-4142, AID Contract No. DAN-4142-C-00-5122-00. The Project is also sometimes referred to as the Pest and Pesticide Management Project, or PPM Project.

The PPM Project compressed into one activity elements of several earlier AID crop pest-related programs, specifically: the Weed Control Systems Utilization for Representative Farms in Developing Countries Project (contract AID/ta-C-1303) conducted 1966-1985 by the International Plant Protection Center at Oregon State University; and the Pest Management and Related Environmental Protection Project conducted 1971-1980 by the University of California (Berkeley) under AID contract csd-3296 and ta-C-1195, and 1979-1985 by the Consortium for International Crop Protection (AID contract DSAN-C-0252).

Specific PPM Project objectives, as stated in the project proposal (July 1985) are: "to expand the capabilities of less developed countries in the areas of pest and pesticide management." The PPM Project was designed to assist developing country farmers to consider, and possibly use, more agronomically, environmentally,

and economically sound crop protection. The PPM Project also reflects the intent to help developing countries closely monitor the need for, use, and handling of pesticides.

PPM Project activities aimed at fostering, expanding, and strengthening regional and national pest and pesticide management programs in developing countries fall within four major categories:

* technical assistance: assist AID missions, AID offices and AID/S&T/AGR with preparation of Project Identification Documents, Project Papers, Initial Environmental Examinations, and Environmental Assessments; assist with implementing crop protection programs in LDCs; provide technical consultancies as needed; and, act as a source of information for specific pest and pesticide problems.

* training: facilitate various pest and pesticide management training courses and activities.

* communication/networking: provide information services and facilitate publication and dissemination of technical pest and pesticide management information.

* research: provide and facilitate a range of pest and pesticide management research assistance.

A specialist has been assigned responsibility for coordinating each function within the project.

B. DESCRIPTION OF ACTIVITIES

The PPM Project utilizes the four components of technical assistance, training, communication/networking, and research to conduct appropriate programs in integrated pest management and environmental protection. Activities primarily focus on the

disciplines of weeds management (terrestrial), entomology, plant pathology, and pesticide management.

The PPM Project provides a source of pest and pesticide management expertise for AID. Assistance is provided through:

- * designing and implementing cost-effective, environmentally sound pest and pesticide management research;
- * identifying pests; assessing pest-caused crop losses;
- * training in a wide range of pest and pesticide management topics;
- * assuring safe use and disposal of any crop pesticides used; and,
- * conducting pesticide use environmental assessments.

C. ORGANIZATION

AID awarded a 5-year contract for the PPM Project to CICP based on a proposal prepared jointly by the Consortium and the International Plant Protection Center at Oregon State, with input from the University of Maryland College Park, the University of Miami Medical School, and the University of Minnesota.

By being contracted through CICP, the PPM Project has access to faculties at the 13 CICP-member universities, plus the U.S. Department of Agriculture. The resulting pool includes experts with combinations of expertise, international experience, and language capability covering most aspects of pest and pesticide management.

As primary contractor, CICP has sub-contracted with five member institutions to conduct various phases of the program. The division of responsibility and organizations involved are:

Consortium for International Crop Protection (CICP)

- * Overall project coordination and administration;
- * Liaison with AID and other donor groups;
- * Project development.

International Plant Protection Center, Oregon State University (IPPC)

- * weed management;
- * training coordination;
- * socio-economics;
- * communication/networking.

University of Maryland College Park, Department of Entomology (UMCP)

- * entomology;
- * technical assistance coordination.

University of Minnesota, Department of Plant Pathology (UMN) and IRRI, Philippines

- * plant pathology;
- * research coordination.

University of Miami, School of Medicine, Department of Epidemiology and Public health (UMI)

- * pesticide residue analysis training;
- * agromedical consulting and training.

In addition, short-term consultants are utilized to perform specific tasks where appropriate. As a general policy, these individuals are selected from CICP-member institutions based on appropriate experience, background, and language skills.

II. ACTIVITIES/ACCOMPLISHMENTS

A. TRAINING

- 1.) Preparation of Pest/Pesticide Management Materials, Honduras. A Field and Laboratory Guide Manual for Weed Control (all in Spanish) was prepared for the Escuela Agricultura Panamericana at request of USAID/Honduras. Ongoing. Project specialist: Shenk.
- 2.) Project Training Coordination, Maryland. Oversight and administrative support for variety of training programs. Ongoing. Project specialist: Steinhauer.
- 3.) Micro-computer Course Planning, Philippines. Develop and arrange for course to be presented in 1988. Ongoing. Project specialist: Teng.
- 4.) Pesticide Residue Analysis Course, Global. A three-month course was presented, 2 participants, at Univ. of Miami, Sept.-Dec. 1986. Project specialist: Mann.
- 5.) Crop Loss Assessment to Improve Pest Management in Rice, South and Southeast Asia. Organization of workshop and development and coordination of resource persons and participants from nine countries. Los Banos, Philippines (IRRI), Oct. 1987. Project specialist: Teng.
- 6.) Crop Loss Assessment Training Course, Philippines. Two-day course conducted at Bureau of Plant Industry, Manila, Philippines for national program scientists. Nov. 1986. Project specialist: Teng.
- 7.) Pesticide Management Course, Grenada. Two one-week sessions in practical pesticide management were presented to Ministry of Agriculture and Extension personnel on Grenada. Nov. 1986, 23 participants. Project specialist: Shenk.
- 8.) Crop Pest Modeling Workshop. Project specialist Teng participated in two-day event. Nov. 1986, Washington, DC.
- 9.) Pesticide Management Courses, Panama. Four one-week courses in practical pest/pesticide management Panama were presented as part of the AID/Panama Technology Transfer Project. Jan. 1987, 96 participants. Project specialists: Shenk; Fischer (consultant).
- 10.) Pest and Pesticide Management Seminar/Workshop, Thailand. One-week conference at Pattaya, Thailand, to review pest and pesticide management problems in Southeast Asia, and develop recommendations for future policies. 200 participants from Thailand, Philippines, Indonesia and Malaysia, and 14 other countries. Feb.-Mar. 1987. Project participants: Steinhauer, Teng (PPM staff); Jensen, Heinrichs, Reissig, Schmidt (consultants).

- 11.) Pesticide Management and Safety Seminar, Costa Rica. One-week seminar for Central American crop protection specialists, sponsored by ROCAP, was presented at San Jose with two lecturers provided by CICP. 45 participants, Mar. 1987. Project participants: Chiri and Davies (consultant).
- 12.) IPM Training, El Salvador. Trained CENTA/IPM Technical Staff in recognition of pest species. 10 participants, Mar. 1987. Project specialist: Chiri.
- 13.) Pesticide Safety Management, Gambia. Three-week course in the Gambia centered on safe use of pesticides. Mar. 1987, 30 participants. Project specialist: Cooper, Fischer (consultant).
- 14.) Weed Management Workshop, Pakistan. One-week training for weed specialists took place in Pakistan with major input from the PPM project. Mar. 1987, 51 participants. Project specialist: Shenk.
- 15.) Pesticide Safety Management, Senegal. Three week course in Senegal on safe use of pesticides. Apr. 1987, 30 participants. Project specialist: Fischer (consultant).
- 16.) Aphid Short Course, Panama. Assist with course at University of Panama focused on identification, biology, and economic importance of aphids, and leading to printing a practical manual on the aphids of agricultural importance in Central America. Apr. 1987. Project specialist: Chiri.
- 17.) Workshop on Integrated Pest Management, Philippines. Two-day workshop at Philippine Bureau of Plant Industry. Participate and assist in developing national work plans for all crops. Apr. 1987. Project specialist: Teng.
- 18.) Aerial Application and Operations Workshop, Niger. One-week workshop at Naimey, to train operators for West Africa anti-locust campaign. Sponsored by AID/OFDA and FAO/ECLC. 27 participants, May 1987. Project provided one instructor, Sanderson (consultant).
- 19.) Immature Insect Identification Workshop, Guatemala. Project provided principal lecturer (Chiri) for 2 two-day workshops on recognizing and identifying immature stages of pest insects. March and May 1987, 16 participants.
- 20.) Pesticide Safety Management, Sudan. A three-week course on safe use of pesticides was presented to technical personnel. June 1987, 25 participants. Project specialist: Cooper.
- 21.) Weed Management Strategies, Global. Three-week intensive short course presented to international technicians, at Corvallis. July-Aug. 1987, five participants. Project specialists: Shenk, Cooper, Deutsch, Miller.

- 22.) Specialized Weed Science Training, Global. A specialized three-week training program developed and conducted for Thai weed scientist. Aug. 1987. Project specialists: Shenk, Cooper.
- 23.) OFDA Pesticide Management Training Workshop (Africa). One-week course for selected scientists to refine skills for application to pest and pesticide management in Africa. Aug. 1987. Project specialist: Cooper.
- 24.) IPM Workshop for INEPA Crop Protection Specialists, Peru. One-week workshop at Chiclayo, Peru, reviewing progress of the crop protection group (SENAPIC) in establishing economic thresholds for major pests in the five regions of Peru. 21 participants, Sept. 1987. Project specialists: Steinhauer (PPM staff) and Irwin, Thurston, York (consultants).
- 25.) Pest and Pesticide Management, (Pakistan). Ten-day workshop for Pakistani agricultural administrators, at Corvallis. Sept. 1987, 20 participants. Project specialists: Cooper, Shenk.
- 26.) IPM Training Course, India. Three-day course at Tamil Nadu Rice Research Institute, Aduthurai, India, serving as resource on epidemiology and disease management. Sept. 1987. Project specialist: Teng.

B. TECHNICAL ASSISTANCE

- 1.) Technical Backstopping for Project Consultants, Projects, and AID/W (including N⁷ ?), Global. Provide a range of technical and logistical activities in the process of arranging for the services of, and coordinating, technical specialist consultants. Ongoing. Project specialists: Steinhauer, Bottrell.
- 2.) USDA PL480 Weed Control Project, Pakistan. Served as cooperating scientist and advisor for five weed management projects managed through USDA, involving review of research, analysis of methods, and scientific guidance. Ongoing. Project specialist: Shenk.
- 3.) Technical Weed Management/Pesticide Management Backstopping, Global. . Research and provision of technical data and other services for AID/W, USAID Missions, LDC cooperating scientists, and various institutions. Ongoing. Project specialists: Shenk, Cooper, Miller, Deutsch.
- 4.) Pest and Pesticide Management, Central America. Provided technical assistance on demand for ROCAP and Central American USAID missions in areas of environmental effects of pesticides, environmental analyses, pest management advice for ongoing agricultural projects, design of projects, and any other matters related to pest and pesticide management. Ongoing. Project specialist: Chiri.

- 5.) Crop Loss Assessment and Database Development, Indonesia. Provided continuing technical backstopping to Indonesia Ministry of Planning in the subject areas. Ongoing. Project specialist: Teng (as consultant).
- 6.) Pesticide Risk/Benefit analysis, Senegal. Risk/benefit analysis was performed as part of a Project Paper for the Agricultural Production Support Project. Oct. 1986. Project specialist: Schaefers (consultant).
- 7.) Locust/Grasshopper Control Assistance, Senegal. Provided experts to conduct a preliminary assessment of efficacy of insect control and possible environmental effects of the use of large planes to spray pesticides. Also prepared a preliminary determination of the potential for conducting an environmental monitoring program during 1987. Oct.-Nov. 1986. Project specialists: Edwards and Huddleston (consultants).
- 8.) Locust/Grasshopper Control Assistance, Burkina Faso. Provided expert to advise USAID Mission in Burkina Faso regarding the outbreak of grasshoppers, and to help coordinate control efforts with other international donors. Oct.-Nov. 1986. Project specialist: Bartholf (consultant).
- 9.) Crop protection Strategy, Burkina Faso. Assistance was provided to USAID/AFR and the CILSS in developing a crop protection strategy for the Sahelian region of Africa. Oct.-Nov. 1986. Project specialist: Paschke (consultant).
- 10.) Pest/pesticide Management Assistance, Grenada. Provided the Grenada Pest Management Unit of the MOA with assistance in developing pest and pesticide management priorities for future attention. Nov. 1986, Mar. 1987. Project specialists: Bottrell; Dively (consultant).
- 11.) Rice Tungro Virus Workshop, Rome, Italy. A three-day workshop was held to review knowledge and define needs for the management of rice tungro virus. Nov. 1986. Project specialist: Teng.
- 12.) Pest Management and Pesticide Management Assistance, Haiti. Provided assistance in the area of pest and pesticide management to USAID usaid-sponsored Tree Nursery Production Project. Nov. 1987. Project specialist: Hellman (consultant).
- 13.) Pest Surveillance and Loss Assessment, Philippines. Provided expertise in developing 1987 work plans for Philippine National Program. Nov. 1986. Project specialist: Teng (as consultant).
- 14.) Locust/Grasshopper Control, Gambia, Mauritania, Senegal. Participated on FAO team to conduct an in-depth review of locust and grasshopper control during the 1986 campaign. Nov.-Dec. 1986. Project specialist: Overholt (consultant).

- 15.) Analyze Tomato Samples, Bolivia. Ten samples from Bolivia were analyzed for a range of pesticide residues. Nov. 1986-Jan. 1987. Project specialist: Mann.
- 16.) Crop Loss Assessment Consulting: Italy, Malaysia, Philippines. Provided expertise on crop loss assessment for FAO Intercountry Program on Integrated Pest Control in Rice in South and Southeast Asia. Nov-Dec. 1986. Project specialist: Teng (as consultant).
- 17.) Pesticide Management, Nepal. Provided assistance to USAID/ARP project and Government of Nepal personnel on safe and economical use of pesticides. Jan.-Feb. 1987. Project specialist: Klarman (consultant).
- 18.) Medfly Eradication, Guatemala and Central America. Assisted USAID/Guatemala, USDA/APHIS, and the Government of Guatemala in defining a scope of work for the Environmental Impact Analysis to be done for the MOSCAMED and CAPMED programs. Feb. 1987. Project specialists: Douth and Mitchell (consultants).
- 19.) Industry Pesticide Training Workshop (International). A workshop was organized for and attended by pesticide industry representatives to explore the potentials for funding pest and pesticide management training in developing countries. Feb. 1987. Project specialists: Miller, Deutsch.
- 20.) Disease Threshold Development, Thailand, Malaysia, India. Provided technical backstopping to analyze data for developing action thresholds to manage blast and sheath blight disease on rice. Feb. 1987. Project specialist: Teng (as consultant).
- 21.) Pest Management Assistance, Haiti. Conducted detailed study of pest problems and formulated pest management recommendations for the Agro-forestry Outreach program. Feb.-Apr. 1987. Project specialist: Tourigny (consultant).
- 22.) Weed Management Advising, Sri Lanka. At request of USAID, discussed weed problems and management alternatives with MOA officials and technicians in Sri Lanka. Mar. 1987. Project specialist: Shenk.
- 23.) Locust/Grasshopper Control Senegal, Gambia, Mauritania, Niger, Mali. Participated on a multidisciplinary team for AID/OFDA to assist USAID missions and National Grasshopper Coordinating Committees to prepare for the 1987 control program. Mar.-Apr. 1987. Project specialists: Cavin, Henderson, Herald, Huddleston, Seethaler, Voss (consultants).
- 24.) Locust/Grasshopper Control Ivory Coast, Mali, Senegal, Kenya, Sudan. Assessed capability of pesticide formulating plants in concerned countries to supply pesticide for locust and grasshopper control campaign. Mar.-Apr. 1987. Project specialist: McWain (consultant).

- 25.) Early and Late Blight on Vegetables, Malaysia. Conducted analysis of cause of early and late blight epidemics using two forecast models. Provided backstopping on fungicide residue problems for Ministry of Agriculture. Apr. 1987. Project specialist: Teng.
- 26.) Locust/Grasshopper Control, Sudan, Ethiopia, Somalia, Kenya, Yemen. Provided USAID/OFDA with team member to assess gravity of pesticide disposal problems in countries concerned. May-July 1987. Project specialist: Jensen (consultant).
- 27.) Initial Environmental Evaluation, El Salvador. Conducted an IEE for a proposed pesticide purchase by USAID/El Salvador under the Basic Grains Program, 1987, for returning displaced families. May 1987. Project specialist: Chiri.
- 28.) Locust/Grasshopper Control, Senegal. Assisted USAID, other donor countries, and Government of Senegal in survey of pest populations, and determining populations that exceeded the economic threshold requiring pesticide application. May-Sept. (Nov.), 1987. Project specialists: Cavin, Huddleston, Philips, and Sanderson (consultants).
- 29.) Environmental Assessment, Bont Tick Eradication, Antigua. Prepared environmental assessment of USDA/APHIS proposal for the pilot eradication project to eliminate the bont tick from the Island of Antigua. June-July 1987. Project specialists: Drummond, Lincer, and Teel (consultants).
- 30.) Locust/Grasshopper Control, Chad. Worked with the government of Chad, MOA, to identify areas of potential infestation by grasshoppers and locusts and help develop an aerial treatment program. June-Sept. 1987. Project specialist: Rivas (consultant).
- 31.) Programmatic Environmental Assessment of Locust/Grasshopper Control in Africa/Asia. Project Team began this activity in Aug. 1987. Project specialists: Cavin, Voss, Matteson, Freed, and Cate (consultants).
- 32.) Pest and Pesticide Management Training, Thailand. Both PPM training and research potentials were discussed with Ministry of Agriculture personnel. Sept. 1987. Project specialist: Cooper.
- 33.) Pest and Pesticide Management Support, Burma. A possible "buy-in" was discussed with USAID representatives. Sept. 1987. Project specialist: Cooper.

C. RESEARCH

- 1.) Planning and Coordinating Research, Global. Arrange and support collaborative research linkages and activities. Ongoing. Project specialists: Steinhauer, Bottrell.

- 2.) IPM and Biological Control, Costa Rica. Assisted CATIE Regional Pest Management Project in design and execution of research on biological control of various pests on crops. Ongoing. Project specialist: Chiri.
- 3.) Striga Control in Africa. Developed a proposal for Striga research coordination in Africa and forwarded draft to various entities in Africa for review. Ongoing. Project specialists: Miller, Deutsch.
- 4.) Use of Micro-computers in Research, Global. Documentation of the use of micro-computers in crop protection research and training continued. Ongoing. Project specialist: Cooper.
- 5.) Disease Management in Rice, Philippines. From base at IRRI, participated in a collaborative research project on the Analysis of Constraints on Implementing Disease Management in Rice, with FAO Intercountry IPC Program. Ongoing. Project specialist: Teng.
- 6.) Nozzle Evaluation, Global. Tests were conducted to evaluate longevity, performance, and wear for different materials used in spray nozzles. Ongoing. Project specialist: Miller (coordinator).
- 7.) Improvement of Plant Protection Services, West Africa. Completed a report on the topic and submitted it to FAO. Nov. 1986. Project specialist: Teng.
- 8.) Analyze Blood Samples, Haiti. In cooperation with health officials in Haiti, 63 blood samples were taken and analyzed. Feb.-May, 1987. Project specialist: Mann.
- 9.) Locust/Grasshopper Control, Sudan. Evaluated the impact of aerial sprays against locust (used in the Emergency Locust Control Campaign) on the environment and non-target organisms. July-Sept. 1987. Project specialists: Bottrell (coordinator); Mann, pesticide toxicologist: Pinto (consultant).
- 10.) Locust/Grasshopper Control, Mali. Conducted research to determine the efficacy of selected pesticides on grasshoppers as well as the impacts of these pesticides on non-target organisms in Mali. July-Oct. 1987. Project specialists: Schaefers (coordinator); Campbell, Kolodny-Hirsch, Edwards, Paschke (consultants).
- 11.) Locust/Grasshopper Control, Niger. Conducted research on the efficacy and practicality of Neem kernel extract for the protection of crops from damage inflicted by locusts and grasshoppers. Aug.-Sept. 1987. Project specialists: Radcliffe (coordinator); Dunkel, Strzok, and Ouedraogo (consultants).
- 12.) Locust/Grasshopper research, Sub-Saharan Africa. Met with ARS and AID officials to exchange information and prepare for launching expert systems (modeling) project. Project specialists: Miller; Croft (consultant).

D. NETWORKING

- 1.) IPM, Central America. Maintained liaison with various organizations involved in the implementation of IPM in Central America, such as CATIE, IICA, ROCAP, ICTA, the various governmental pest management or crop protection agencies, and the universities in Panama, El Salvador, Honduras, Guatemala, and Costa Rica. Ongoing. Project specialist: Chiri.
- 2.) Project Facilitation, Maryland, Corvallis. Planning, reporting and responding to technical requests. Ongoing. Project specialists: Steinhauer, Miller, Bottrell, Deutsch, Mann.
- 3.) International Alliance for Sustainable Agriculture. Project specialist Teng is chair of the science panel advising on "Alternatives to Twelve Hazardous Pesticides." Ongoing. Project specialist: Teng.
- 4.) Distribution of Technical Print Materials, Global. More than 400 copies of technical books and pamphlets, 1,064 reprints, and other materials were disseminated to over 300 requestors in LDCs. Ongoing. Project specialist: Deutsch (coordinator).
- 5.) Production and Distribution of INFOLETTER, International. Two issues of INFOLETTER were produced and distributed to over 8,800 recipients (as of Sept. 1987) during the year. Ongoing. Project specialist: Deutsch.
- 6.) Computer-aided Instruction, Global. Preparation of instruction modules for pesticide safety and application topics were completed. Ongoing. Project specialist: Cooper.
- 7.) Support for Haustorium, Global. IPPC served as publisher for Haustorium, the newsletter of the international parasitic plants working group. Ongoing. Project specialist: Deutsch (coordinator).
- 8.) Support for IWSS, Global. IPPC continued to serve as the secretariate for the International Weed Science Society. Ongoing. Project specialist: Miller (coordinator).
- 9.) Maintenance of Worldwide Mailing List. The worldwide mailing list utilized by the project was maintained and upgraded (on a daily basis). Ongoing. Project specialist: Deutsch (coordinator).
- 10.) Pest and Pesticide LDC Libraries Enhancement, Global. Program of soliciting, collecting, and redistributing unused/unwanted technical books and journals to libraries in LDCs was continued. Ongoing. Project specialist: Deutsch.
- 11.) International Benchmark Sites Network for Technology Transfer (IBSNAT), Global. Cooperative work was conducted with this AID/S Natural Resources Project. Nov. 1986. Project specialist: T.

- 12.) Biological Control and IPM, Egypt. Discussed collaboration with MOA and university officials in the area of biological control of pests of various Egyptian crops and the development of pest management programs for additional cropping systems. Jan. 1987. Project specialist: Bottrell.
- 13.) IPM, Peru. Met with USAID personnel and officials of the National Agricultural Research Organization (INIPA) to discuss IPM project development in Peru. Feb. 1987. Project specialist: Irwin (consultant).
- 14.) Thai MOA, Bangkok. Consult with rice scientist on disease management. Backstopping to analyze data for developing action thresholds to manage blast and sheath blight diseases. Feb. 1987. Project specialist: Teng.
- 15.) Pesticide Management and Safety, Costa Rica. Coordinated with IICA to plan for a pesticide management and safety seminar to be held at IICA headquarters in San Jose, Costa Rica. Mar. 1987. Project specialist: Chiri.
- 16.) Philippine Council for Crop Protection Annual Meeting, Philippines. Participated in discussions on international linkages. Apr. 1987. Project specialist: Teng.
- 17.) International Agriculture Development Conference. Served as an invited member of an international newsletter panel and presented a paper at the annual conference of the Association of U.S. University Directors of International Agricultural Programs. June 1987. Project specialist: Deutsch.
- 18.) Biological Control, Kenya. Signed Memorandum of Understanding with the International Centre for Insect Physiology and Ecology for the development of research and training collaboration between ICIPE and Project institutions. July 1987. Project specialist: Steinhauer.
- 19.) International Botanical Congress, W. Berlin. Attended Congress session on data management and networking of botanical databases and accept sixth Erikson Gold Medal and prize. Aug. 1987. Project specialist: Teng.
- 20.) American Phytopathological Society Meeting. Attend meetings and discuss participation in international activities. Aug. 1987. Project specialist: Teng.
- 21.) International Congress of Plant Pathology, Japan. Attend planning meeting for next year's congress to finalize sessions on epidemiology and disease management as co-convener of seven symposia and chair of epidemiology committee. Aug. 1987. Project specialist: Teng.

E. PROJECT OUTPUT: Publications, Papers, Presentations Generated Through the Integrated Pest Management and Environmental Protection Project (excluding consultant technical reports)

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- 1.) Action Plan for the Improvement of Plant Protection Services in Central Africa, P.S. Teng, report submitted to FAO, Nov. 1986.
 - 2.) Weed and Pesticide Management Training Designed for Developing Countries, A.S. Cooper, M.D. Shenk, A.E. Deutsch; Proceedings of the Weed Science Society of America, Feb. 1987
 - 3.) Research Needs for Rice Disease Management, P.S. Teng, paper presented at Pesticide Management and IPM Workshop, Thailand, Feb. 1987.
 - 4.) Interference of Annual Weeds in Seedling Alfalfa (*Medicago sativa*), A.J. Fischer, J.H. Dawson, and A.P. Appleby, ms. accepted for publication in Weed Science, Sept. 1987.
 - 5.) A Call for Improved Management of Pesticides, M.D. Shenk, paper presented at Pak-Indo Weed Control Workshop, Pakistan, Mar. 1987.
 - 6.) Lever-Operated Knapsack Sprayers, A.E. Deutsch, Farm Chemicals International, Mar. 1987.
 - 7.) Malezas Tropicales/Tropical Weeds, bilingual republication of work previously supported by AID-Oregon State Univ. weed management project.
 - 8.) Instructor's Manual for Weed Management, L.C. Burrill, M.D. Shenk, FAO Training Series No. 12, Nov. 1986.
 - 9.) Field and Laboratory Guide Manual, M.D. Shenk, prepared for and published by Escuela Agricultura Panamericana, 1986-87.
 - 10.) Pesticide Management Training, A.E. Deutsch, A.S. Cooper, Farm Chemicals International, June 1987.
 - 11.) Along the Path Between Prudence and Puffery: or, Can a Dirt-brown Broadsheet be an Effective Newsletter?, A.E. Deutsch, Proceedings, Conference on Agricultural Development: Systems and Communications, June 1987.
 - 12.) Live Mulching: A Conservation Technique, A.S. Cooper, paper presented at Kasetsart Univ., Thailand, Sept. 1987.
 - 13.) Weed Science in the Tropics--Principles and Practices, and A Handbook of West African Weeds, both by I.O. Akobundu, written while on sabbatic at Oregon State University through arrangements with IPM-EP project, 1986-87.

III. DISTRIBUTION OF PERSONNEL EFFORT AND PROJECT-RELATED TRAVEL

A series of tables summarizes personnel effort expended for project activities for the report year, and since project inception:

- Table 1 - Project technical personnel (core funded FTE as of 9-30-87)
- Table 2 - Chronological distribution of personnel effort
- Table 3 - Chronological summary of project staff international travel
- Table 4 - Chronological summary of project consultants' international travel
- Table 5 - Chronological summary of project consultants' activities (excluding international travel)
- Table 6 - Summary of level of effort (person months)

Table 1

PROJECT TECHNICAL PERSONNEL (FTE core funded, as of 9-30-87)

name	institution	position	FTE
A.L. Steinhauer	UMCP	PPM Project Director, UMCP entomologist	0.5
S.F. Miller	IPPC/OSU	PPM Project Deputy Director, IPPC Director, agr. econst.	0.5
M.D. Shenk	IPPC/OSU	PPM Training coordinator, IPPC weed scientist	0.9
J.B. Mann	UMI	Pesticide Residue Chemist	0.75
A.E. Deutsch	IPPC/OSU	PPM and IPPC communication/networking Coordinator	0.7
D.G. Bottrell	UMCP	PPM Technical Assistance Coordinator, UMCP entomolgst.	0.5
A. Chiri	UMCP/ROCAP	Regional Pest Management Specialist	0.5
A.S. Cooper	IPPC/OSU	Weed Scientist/Computer Specialist	0.5
P.S. Teng	UMN/IRRI	PPM Research coordinator, IRRI plant pathologist	0.29

 Table 2

 CHRONOLOGICAL DISTRIBUTION OF PERSONNEL EFFORT
 =====

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>PM</u>	<u>Specialist</u>
----- <u>Training</u> -----				
Coordinating	Maryland	*	0.5	Steinhauer
Prepare training materials for Honduras	Corvallis	*	2.55	Shenk
Pesticide Res. Course	Miami	Sept., Oct.	2.0	Mann
Crop Loss Course	Philippines	Nov.	0.5	Teng
Pesticide Management	Grenada	Nov.	1.0	Shenk
Pesticide Management	Panama	Jan.	1.0	Shenk ₁ /
Pesticide/IPM Wkshp.	Thailand	Feb.	0.4 0.5	Teng Steinhauer
Pesticide Management	Gambia	Mar., Apr.	1.5	Cooper ₁ /
Weed Management	Pakistan	Mar.	1.0	Shenk
IPM Workshop	Philippines	Apr.	0.1	Teng
IPM	Central America	Apr.-Sept.	0.6	Chiri
Pesticide Management	Sudan	June, July	1.5	Cooper ₁ /
Weed Management	Corvallis	Jul.-Aug.	1.0 1.0 0.5 0.8	Cooper Shenk Miller Deutsch
Visiting scientist	Corvallis	Aug.	0.5 0.5	Cooper Shenk
OFDA training sem.	Wash., DC	Aug.	0.5	Cooper

Table 2 (cont.)

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>PM</u>	<u>Specialist</u>
Pest/Pesticide Mgmt. (Pakistani Scientists)	Corvallis	Sept.	0.5 0.5	Cooper Shenk
IPM workshop	India	Sept.	0.2	Teng
Micro-computer (1988) course planning	Philippines	*	0.3	Teng
----- <u>Technical Assistance</u> -----				
Tech. backstopping for Project consultants	Maryland	* *	1.0 2.0	Steinhauer Bottrell
Pakistan PL480	Corvallis	*	2.0	Shenk
Tech. backstopping for NARP	Maryland	* *	0.5 0.5	Steinhauer Bottrell
Tech. backstopping for AID/W	Maryland	* *	2.0 1.5	Steinhauer Bottrell
Tech. backstopping for AID/W and LDC scientists/institutions	Corvallis	* *	1.5 1.0	Shenk Cooper
Library maintenance	Corvallis	* *	1.0 0.5	Miller Shenk
Action thresholds	Thailand, Malaysia, India	*	0.3	Teng
Rice tungro virus	Philippines	Nov.	0.1	Teng
Analyze Bolivian tomato samples	Miami	Nov.	2.5	Mann
IPM	Grenada	Nov., May	0.5	Bottrell
Crop loss assess.	Malaysia	Nov.	0.1	Teng
Industry pesticide training workshop	Corvallis	Feb.	1.0 1.0	Miller Deutsch

Table 2 (cont.)

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>PM</u>	<u>Specialist</u>
Weed Management	Sri Lanka	Mar.	0.5	Shenk
Tech. Assistance for USAID	Central America	Apr.-Sept.	3.0	Chiri
Vegetable IPM	Malaysia	June	0.1	Teng
Pesticide alternatives	various	1986	0.05	Teng
Pest databases/comput.	Indonesia	1986/87	0.1	Teng
Pest/pesticide management	Burma Thailand	Sept.	0.5	Cooper
----- <u>Research</u> -----				
Planning collab- orative research	Maryland	*	0.5	Steinhauer
Coordinating research in Grenada	Maryland/ Grenada	*	0.5	Bottrell
Striga control proposal/Africa	Corvallis	*	1.0 0.5	Miller Deutsch
Rice thresholds/ crop losses	Asia	*	0.2	Teng
Microcomputer/pest management applic.	Corvallis	*	1.5	Cooper
Nozzle evaluation	Corvallis	*	0.5	Miller
W. Africa action plan	FAO/Cameroon	Nov.	0.2	Teng
Analysis of Haitian blood samples	Miami	Feb.-May	3.0	Mann
Planning/Review	Central America	Apr.-Sept.	0.4	Chiri
Environ. assessment	Sudan	July	0.5	Mann
Grasshopper/locust	Bozeman	Sept.	0.5	Miller

Table 2 (cont.)

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>PM</u>	<u>Specialist</u>
----- <u>Networking</u> -----				
Responding to requests	Maryland	*	1.0 0.5	Steinhauer Bottrell
Publications	Corvallis	*	1.5 0.5	Deutsch Miller
Rice pest management	Asia	*	0.33	Teng
Newsletters	Corvallis	*	3.0	Deutsch
Course networking	Miami	*	1.75	Mann
Reports/planning	Corvallis	*	1.0 1.0	Miller Deutsch
Reports/planning	Miami	*	1.0	Mann
International meetings	global	*	0.2	Teng
IWSS activities	Corvallis	*	1.0	Deutsch
Biochemical control	Egypt	Jan.	0.5	Bottrell
International meetings	U.S.	Jan., June	0.5	Deutsch
USAID Missions, CATIE, LA Institutions	Central America	Apr.-Sept.	2.0	Chiri
MOU-ICIPE	Kenya	July	0.25	Steinhauer
Total Effort			68.03	

* = entire year (ongoing)

1/ - buy-in (increased authorized PM for Sherk to 12, Cooper to 8.5)

 Table 3

 CHRONOLOGICAL SUMMARY OF PROJECT STAFF INTERNATIONAL TRAVEL
 =====

<u>Project Activity</u>	<u>Where</u>	<u>When</u>	<u>Specialist</u>
----- <u>Training</u> -----			
IPM Workshop	Peru	Sept.	Steinhauer
Pest Management courses	Grenada	Nov.	Shenk
* Crop loss consultancy	Philippines	Nov.	Teng
Pesticide Mgmt. courses	Panama	Jan.	Shenk
Southeast Asia Pesticide/IPM Workshop	Thailand	Feb.	Steinhauer Teng
* Pesticide Safety Awareness course	Gambia, Senegal	Mar.	Cooper
* Prepare for Weed Management course	Sri Lanka, Pakistan	Mar.	Shenk
* Immature Insect Workshop	Guatemala	May	Chiri
* Regional/Aphid Short course	Panama	Apr.	Chiri
* Safe Management of Pesticides course	Sudan	June	Cooper
----- <u>Technical Assistance</u> -----			
Provide pest/pesticide management services to Ministry of Agriculture	Grenada	Nov., Mar.	Bottrell
* Rice tungro workshop, crop loss consultancy	FAO/Italy	Nov.	Teng
* Crop loss consultancy	Malaysia	Nov.	Teng
* UNDP project consultancy	Thailand	Feb.	Teng
* National IPM Workshop	Philippines	Apr.	Teng
* IEE for Pesticide Use on Basic Grain Program	El Salvador	May	Chiri

Table 3 (cont.)

<u>Project Activity</u>	<u>Where</u>	<u>When</u>	<u>Specialist</u>
* Assist Regional IPM Staff	Guatemala	June	Chiri
* Assist in organizing Pest/Pesticide Management Workshop	El Salvador	July	Chiri
* Assist Regional IPM Staff	Honduras	July	Chiri
Conduct environmental assessment	Sudan	July	Mann
* Design IPM Research on Tomatoes	Guatemala	Aug.	Chiri
* Assist university in arachnid survey	Honduras	Sept.	Chiri
-----Research-----			
(no international travel)			
-----Networking-----			
Project collaboration discussions	Egypt	Jan.	Bottrell
* International meetings	Germany, Japan	July, Aug.	Teng
* Presentations, ASEAN area international meetings	Asia	Sept.	Cooper

* Travel funds provided from sources other than AID Contract:
 DAN-4142-C'00-5122-00

 Table 4

 CHRONOLOGICAL SUMMARY OF PROJECT CONSULTANTS INTERNATIONAL TRAVEL
 =====

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>Specialist</u>
----- <u>Training</u> -----			
Southeast Asia Pesticide/IPM Workshop	Thailand	Feb.	Jensen Heinrichs Reissig Schmidt
* Present paper at ROCAP seminar	Costa Rica	Mar.	Davies
* Safe Management of Pesticides course	Senegal	Apr.	Fischer
* Aerial Application and Operations Workshop sponsored by AID/OFDA and FAO/ECLO	Niger	May	Sanderson
IPM Workshop for Peru	Peru	Sept.	Irwin Thurston York
----- <u>Technical Assistance</u> -----			
* Conduct preliminary aerial application assessment, plan for 1987 environmental monitoring program	Senegal	Oct.	Edwards, Huddleston
* Provide pesticide risk/benefit analysis	Senegal	Oct.	Schaefers
* Provide assistance to USAID/Burkina on Locust/Grasshopper Control	Burkina	Oct.	Bartholf
* Provide assistance to CILSS and USAID in preparation of a Sahelian Crop Protection Strategy	Burkina	Oct.	Paschke
Provided pest/pesticide management services to the Ministry of Agriculture	Grenada	Nov.	Dively

Table 4 (cont.)

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>Specialist</u>
* Member FAO team reviewing 1986 locust/grasshopper campaign	Gambia Mauritania Senegal	Nov.	Overholt
* Advise USAID, ARP project and HMG Nepal personnel on safe and economical use of pesticides	Nepal	Jan.-Feb.	Klarman
* Assist USAID/Guatemala, USDA/APHIS, and Univ. of Guatemala in defining a scope of work for environmental assessment for USDA/APHIS proposed Medfly eradication project in Guatemala and second phase involving rest of the CA/P region	Guatemala	Feb.	Doutt Mitchell
* Prepare report detailing pest problems and pest management recommendations for agroforestry outreach project nurseries	Haiti	Feb.	Tourigny
Serve on a multi-disciplinary AID/OFDA team to assist USAID Missions and National Grasshopper Coordinating Committees to elaborate plans for the 1987 Grasshopper Control Program	France Senegal Gambia Mauritania Niger, Mali	Mar.-Apr.	Cavin Henderson Herald Huddleston Seethaler Voss
Assist USAID Missions and National Grasshopper Coordinating Committees by providing assessment of pesticide formulating plants	Ivory Coast Mali Senegal Kenya, Sudan	Mar.-Apr.	McWain
* Serve on AID/OFDA funded pesticide disposal survey team in East Africa	Sudan Ethiopia Somalia Kenya, Yemen	May-July	Jensen
Assist USAID and other organizations in locust/grasshopper survey and delimiting populations above economic thresholds for pesticide application	Senegal	May-Sept.	Cavin Huddleston Philips Sanderson
Prepared Environmental Assessment for Tropical Bont Tick Control and Management Project	Antigua	June-July	Drummond Lincer Teel

Table 4 (cont.)

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>Specialist</u>
With Government of Chad MOA identify areas of potential grasshopper infestation and assist in development of a detailed aerial treatment program	Chad	June-Sept.	Rivas
With USAID Crop Protection and Locust Control Specialists and government officials to obtain information for developing a Programmatic Environmental Assessment for Locust/Grasshopper Control in Africa	England, Italy	Sept.	Cavin Voss
* Pest Management assistance for Haitian Fruit Tree Nursery Production Project	Haiti	Nov.	Hellman
----- <u>Research</u> -----			
* Determine efficacy and environmental impact of selected insecticides against locust/grasshoppers in Mali	Mali	July-Sept.	Schaefers Campbell Kolodny- Hirsch
* Evaluate environmental impact of aerial locust sprays as used in the Emergency Locust Campaign	Sudan	July-Aug. Aug.-Sept.	Pinto Mann Pinto
* Determine efficacy and environmental impact of selected insecticides against locust/grasshoppers in Mali	Mali	Sept.	Edwards Paschke
Determine efficacy and practicality of Neem kernal extract for control of locusts/grasshoppers in Sahel	Niger	Aug-Sept.	Dunkel Radcliffe Strzok
----- <u>Networking</u> -----			
Discuss IPM project development with USAID personnel and INIPA officials	Peru	Feb.	Irwin

* Services provided under funding from sources other than AID
Contract: DAN-4142-C-00-5122-00

 Table 5

 CHRONOLOGICAL SUMMARY OF PROJECT CONSULTANTS' ACTIVITIES
 (excluding international travel)
 =====

<u>Project output</u>	<u>Where</u>	<u>When</u>	<u>Specialist</u>
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-----Technical Assistance-----

Programmatic Environmental Assessment of the African Locust/Grasshopper Control endeavors of USAID	USA	Aug.-Sept.	Cate Cavin Freed Matteson Voss
Project to Determine efficacy and practicality of NeeM Kernel extract for control of locusts/grasshoppers in Sahel	USA Niger	Aug.-Sept.	Strzok Ouedraogo

 Table 6

 SUMMARY OF LEVEL OF EFFORT (PERSON-MONTHS)
 =====

Activity Component

Personnel Component	Research	Technical Assistance	Training	Networking	TOTAL
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For Report Year, Oct. 86 - Sept. 87

Project Technical Staff	9.3	23.25	19.45	16.03	68.03
Consultants	16.9	52.4	8.6	0.5	78.4
Support Staff	----	----	----	----	47.4*
				TOTAL	193.83

Cumulative From Project Inception, Oct. 85-Sept. 87

Project Technical Staff	18.2	43.3	50.15	45.63	157.23
Consultants	16.9	71.85	11.65	0.5	100.9
Support Staff	----	-----	----	----	<u>86.4</u>
				Total	344.53

*Support Staff:	CICP Hdqtrs	24.0
	IPPC	20.5
	UMI	2.5
	Neem Project	.4
	Total	<u>47.4</u>

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IPPC ACTIVITIES - COMPLETED AND PLANNED

October 1, 1986 to December 31, 1987

Training Completed

Grenada: two one-week courses on Pesticide Management, October 31 - November 20, 1986.

Panama: four one-week courses on Pesticide Management, January, 1987; buy-in \$24,000.

Gambia: one two-week course on Pest and Pesticide Management as part of the AID/OFDA grasshopper-locust campaign, March 30 - April 10, 1987; buy-in \$8,000.

Senegal: one two-week course on Pest and Pesticide Management as part of the AID/OFDA grasshopper-locust campaign, April 10 - 24, 1987; buy-in \$9,000.

Pakistan: PAK-INDO-US Weed Control Workshop, March 11 - 14, 1987.

Honduras: prepared, and submitted for publication the revised version of Weed Manual for the Panamerican Agricultural School, El Zamorano; buy-in \$7,000.

Honduras: prepared and submitted Field and Laboratory Guide Manual for Weed Management for the Panamerican Agricultural School, El Zamorano; buy-in \$6,000.

Corvallis: continued development of microcomputer training modules on Pesticide Safety. Materials are available as slides, diskettes, and/or overheads.

Corvallis: prepared two short term non-degree training programs for international weed scientists from Thailand and Pakistan; buy-in \$3,000.

Training Planned

The Second International Symposium on Weed Control, jointly sponsored by IDRC, IWSS, and IPPC will be held in Canada, July, 1988. The roles of the various cooperators and arrangements are presently being discussed.

Sudan: one two-week course in Pest and Pesticide Management as part of the AID/OFDA grasshopper-locust campaign, June 8 - 21, 1987; buy-in \$7,000.

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Corvallis: Weed Management Strategies course, July 13 - 31, 1987; buy-in \$26,700.

Corvallis: Pest and pesticide training as part of Technical and Management Course for Middle Level Agricultural Managers of Pakistan; buy-in \$2,000.

Sri Lanka: Weed Management Course, August 21 - September 12, 1987; buy-in \$26,000.

Pakistan: Weed Management Course, September 13 - 30, 1987; buy-in \$13,000

Panama: Weed Management Course, November 23 - December 18, 1987; buy-in \$23,000.

Malawi: Weed Management Course, tentatively scheduled for October, 1987; presently negotiating buy-in.

Technical Assistance

Pakistan: evaluated USDA PL 480 Weed Research Program March 16 - 25, 1987.

Sri Lanka: reviewed AID funded weed control activities; prepared plan for weed control course, March 26 - April 1, 1987.

Somalia-Ethiopia-FAO: provided training materials for FAO sponsored weed control course; buy-in \$5,000

Belize, Costa Rica, Mexico, Honduras, Zimbabwe: as part of WSSA-IWSS-IPPC library improvement program, provided weed control books; buy-in \$5,000.

Provided technical weed information to 46 requestors including:

WINBAN, St Lucia
South Pacific Commission, Fiji
Fundacion Hondurena de Investigacion Agricola, Honduras
World Aid, London
IDRC, Canada
IITA, Nigeria
Tinsulanonda Fishery College, Thailand
IRRI-Bhutan Rice Farming System Project
Pesticide Farm Safety Center, UC Davis, CA
CIP, Peru
OFDA/AID
Mauritius Sugar Industry Research Institute, Reduit
Organizacion Panamericana de la Salud, Panama

Corvallis: provided technical information, publications, and assistance to several equipment manufacturers. A major international equipment manufacturer modified its lever-operated knapsack sprayer design based on information developed by IPPC.

Gambia: reviewed AID/Banjul grasshopper-locust Action Plan for the Gambia, April, 1987.

Publications and Networking

Corvallis: Two issues of INFOLETTER were prepared. One was printed and distributed to approximately 8,500 recipients in over 140 countries. The other is presently being printed.

Corvallis: IPPC, collaborating with the International Parasitic Seed Plant Research Group, designed and produced HAUSTORIUM, the parasitic weed newsletter. The publication is funded through an AID contract held by Old Dominion University, and distributed to 68 countries.

Colombia: TROPICAL WEEDS, a major book on weed taxonomy prepared by IPPC, was republished jointly with the Colombian Weed Science Society.

Rome: FAO published the Instructor's Manual for Weed Management, (in English) written by IPPC staff. French and Spanish versions are presently being prepared.

Corvallis: nearly 100 copies of 14 titles (major publications) were distributed in response to 54 requests. 654 copies of IPPC papers were distributed (free) to 82 recipients.

Corvallis: distributed copies of the microcomputer training module (manual, diskettes, slides and/or overheads) on Pesticide Safety to 7 countries including Philippines, Mexico, Thailand, India, and the West Indies.

Corvallis: consistent with AID's desire to privatize international assistance and training, IPPC personnel prepared and presented a proposal to the agricultural chemical industry and equipment manufacturers for joint funding of pest and pesticide management courses. A meeting was held in St. Louis with representatives of 11 national and international firms. Preliminary company responses are supportive.

Corvallis: developed and published Dates and Events for International Crop Protection, a monthly listing of meetings, conferences, and major crop protection world events

Corvallis: a new version of the PPM LEAFLET, with revised Arabic text, was prepared and to be printed, but additional changes were requested by CACP Central. Additional new information is to be provided by the PPM Project research coordinator along with clarification of the role of IRRI in the project. The pending requests will necessitate a complete re-write, redesign and re-printing.

Corvallis: published the PPM Annual Report. Text was provided by the PPM institutions.

Corvallis: updated the IPPC computerized listing of pesticide application equipment manufacturers worldwide.

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Corvallis: prepared a draft proposal for technical assistance in small-scale equipment for pesticide application and submitted it to AID (OEO/AFR).

Papers Prepared

"Weed Control in Maize in the Tropics," in Weed Control in Tropical Crops, Vol. II, K. Moody (ed.), October, 1986, Southeast Asian Regional Center for Graduate Study and Research in Agriculture.

"Lever-Operated Knapsack Sprayers," Farm Chemicals International, March, 1987.

"Weed and Pesticide Management Training for Developing Countries," presented at the Weed Science Society of America Annual Conference, St. Louis, MO, February, 1987.

"Pesticide Management Training for the Third World," Farm Chemicals International, to be published in July, 1987.

Three papers have been requested and are presently being prepared for the 11th International Congress of Plant Protection scheduled for Manila, October, 1987; the International Conference on Pesticides in Tropical Agriculture of Malaysia; and Farm Chemicals International, October, 1987.

Research

Corvallis: cooperating with private industry and the OSU Ag. Engineering Dept., IPPC is evaluating nozzle design for pesticide application. The work will be concluded and published in the winter of 1987.

Corvallis: continued work on living mulches as a weed control technique. A literature retrieval database is presently available, and a major publication will be completed in the summer of 1987.

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