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**WEED
CONTROL
SYSTEMS**

TITE
PN-AAF-7211

1976-77

ANNUAL REPORT

NAE

Introductory Note:

In 1976, the longtime Agency for International Development/Oregon State University weed control systems research and assistance program aimed at developing countries was redefined into two closely linked contracts, research (R) and technical assistance (TA). The two activities function in tandem, have a synergistic effect, and are virtually inseparable in the field. Hence, they have been combined into a single annual report. The two contracts are treated individually in the finances and budgets section only.

SUMMARIES

A. PROJECT SUMMARY

1. Project Titles: (R)-WEED CONTROL SYSTEMS FOR REPRESENTATIVE FARMS
IN DEVELOPING COUNTRIES

(TA)-WEED CONTROL SYSTEMS UTILIZATION FOR REPRESENTATIVE FARMS
IN DEVELOPING COUNTRIES
2. Contract Numbers: (R) - AID/ta-C-1295
(TA) - AID/ta-C-1303
3. Principal Investigator: Dr. Stanley F. Miller, Director
International Plant Protection Center
Oregon State University
Corvallis, OR 97331 / USA
4. Contractual Period: April 1, 1976 through March 31, 1979
5. Period Covered by this Report: April 1, 1976 through March 31, 1977
6. Total AID Funding of Contracts to Date: (R) - \$160,026.55*
(TA) - \$201,352.79**
7. Total Expenditures and Obligations Through Previous Contract Year:
none
8. Total Expenditures and Obligations for Current Year:
(R) - \$160,026.55
(TA) - \$201,352.79

**Includes all of first year, plus a portion of second year.*

***Includes all of first and second year, plus support for Thai aquatic weed short course.*

B. NARRATIVE SUMMARY OF ACCOMPLISHMENTS AND UTILIZATION

Work under the two OSU-AID projects "Weed Control Systems for Representative Farms in Developing Countries" and "Weed Control Systems Utilization for Representative Farms in Developing Countries" has been initiated in two new geographical locations--Central America (Costa Rica) and Southeast Asia (Philippines). OSU personnel moved to Costa Rica in 1977 and became an integral element of the CATIE small farm project. Trials have been established, with traditional bean and corn crops, to determine efficient, safe weed control systems. Chemical seed-bed preparation is also being evaluated. Project personnel participated as lecturers in a weed control short course in Nicaragua. Other courses are being developed for other Central American locations.

A memorandum of understanding was developed to start cooperative work in Southeast Asia with the National Crop Protection Center at Los Banos, Philippines. Work will focus on upland crops--rice, corn, vegetables, and grain sorghum--along with training, field surveillance, and information dissemination.

Through a subcontract with the University of Florida, a new effort in aquatic weed control was initiated. IPPC/UF personnel made several trips to collect information pertaining to the severity of aquatic weed problems. An aquatic weed short course, "Control of Aquatic Weeds and an Assessment of their Economic Significance in Thailand," was scheduled in late March and April of 1977 at the request of the Thailand National Research Council. An action project for aquatic weed research in Thailand was to be developed in the course.

Results from El Salvador indicate that the most effective weed control, system both from an individual and social point of view, was the use of manual methods for small and medium farms. However, weed control systems of large farms are affected by government policies and programs as the latter relate to direct and indirect herbicide subsidies.

A new project has been initiated to test and develop effective methods for using and maintaining small application equipment, particularly "knapsack" sprayers.

Project personnel at OSU continued to develop and foster the weed scientific community through information dissemination, special studies and reports, and participation in workshops and conferences. Five issues of INFOLETTER were distributed to nearly 4,000 recipients in more than 120 countries. Correspondence for assistance was received from 36 countries. IPPC serves as the Secretariat for the International Weed Science Society, now with over 400 members. Twenty-one papers and publications were prepared by IPPC personnel and given at eight national and regional weed control society meetings.

ANNUAL REPORT 1976-77

Weed Control Systems for Representative Farms
in Developing Countries (AID/ta-C-1295)

Weed Control Systems Utilization for Representative
Farms in Developing Countries (AID/ta-C-1303)

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GENERAL BACKGROUND

In many parts of the world the economic position of small-and medium-sized farm enterprises in developing countries has deteriorated with the advancement of agricultural technology. Costs for the requisite inputs (fertilizer, seed, irrigation) have pushed dramatic production increases out of reach, except for more affluent farmers. Economics and market realities have tended to focus the attention of agricultural input manufacturers on the larger more commercialized operations. For many countries the undeniable need to increase production has caused national agricultural development programs to neglect the small grower.

Where new technology has been utilized the weed problem has often been intensified because weeds, as well as crops, responded favorably to improved growing conditions. New cultivars have often been found to be less competitive with weeds than native varieties. Additional studies have shown that in some areas where herbicides have been used for several years weed populations have been observed to shift from relatively controllable broadleaf varieties to more pernicious grassy species that, once established, become extremely difficult to control.

The international community of organizations sponsoring agricultural development research became increasingly concerned over the deteriorating situation. Questions were raised regarding weed control needs and technologies in developing countries such as:

1. To what extent are weeds limiting production, either by their direct competition with crop plants for available nutrients, light, and water, or by their demands for agricultural inputs for control, i.e., land, labor, and capital?
2. given the prevailing constraints--economic, social, and political--what realistic level of agricultural technology could or should be instituted for weed control?
3. what is the inter-relationship of weed control technology with other advanced agricultural inputs?
4. and, how do various weed control systems--including the absence of control--affect the farmer, his family, the associated labor pool, and the community, both economically and socially?

As a result of this dialog, the AID-Oregon State University weed control research project, a contractual relationship begun in 1966, was asked to consider the newly emerging implications of weed control. The formerly production-oriented research effort was restructured in 1972 to include a broader overview of peasant farm problems and to work toward evolving weed control systems for representative farms in developing countries. At the same time, the project assumed the added dimension of assessing the social and economic impact of weed control technology related to employment and income distribution. Initially the restructured project effort was in Brazil and El Salvador. The Brazil and El Salvador programs were completed by phases and terminated in 1976. New project areas were identified in Central America and Southeast Asia.

A. PROJECT OBJECTIVES AS STATED IN THE CONTRACT

Broadly the project constitutes one of many elements in the overall effort to raise food crop production levels. In more specific focus the target is reduction of food crop losses due to weed competition to the extent that production gains are justified economically and socially. Attempts to develop and evaluate weed control technologies for representative farms imply a special emphasis on smaller-sized, subsistence farms. Resulting technologies, or systems, are evaluated in terms of various societal goals and performance criteria, including economic efficiency, employment and income distribution.

Other stated objectives include:

- train host country counterparts in appropriate weed control research methodology;
- promote practical and safe usage of herbicides and other pesticides through training programs;
- encourage evaluation of ecological-environmental aspects of weed control systems;
- and foster continued development and maintenance of a world-wide communication/information network for weed control linking the institutions and individuals concerned.

B. ACCOMPLISHMENTS TO DATE

Project provides weed systems component to CATIE (Costa Rica)

Tropical de Investigación y Enseñanza (CATIE) at Turrialba, Costa Rica. Both research and technical assistance are included in the regional project. The two AID/OSU team members drove project vehicles from Corvallis, Oregon to Turrialba in August, 1976, and began work immediately.

Trials established include:

- herbicide selectivity for beans;
- herbicide selectivity for beans and corn grown together;

Two weed Oregon State University scientists were assigned to the AID-ROCAP effort carried out through the Centro Agronómico

CATIE is a scientific and educational non-profit autonomous institution established in 1973 as a regional center supporting agricultural development in Central America and the Caribbean. Located on 1,100 hectares of land with headquarters at Turrialba, CATIE has launched research, training, and technical cooperation programs to meet its objectives.

- two soil persistence trials to determine which crops can be planted in herbicide-treated areas, and when;
- two trials to explore methods of assisting in seedbed preparation for beans in areas where dense stands of grass must be removed before planting can take place (preliminary results indicate that both plowing and herbicide application--using glyphosate--are more effective and less expensive than the current method of chopping grass.

More trials are planned to check initial results. Also, a full program of research trials were designed to be implemented during the April-June growing season to compare yields and economies of various agricultural inputs for corn and beans.

AID/OSU Team participates in
Nicaraguan weed control short course

At the request of officials in Nicaragua, AID/OSU team members

Myron Shenk and Eduardo Locatelli took part in presenting a two-week weed control short course at Leon, Nicaragua, during March. More than 30 individuals attended the sessions which covered a wide gamut of topics specifically tailored for the local needs.

The average scores of two examinations given over the same material--early in the course and the second at completion of the course--increased from below 50 percent to nearly 80 percent. Attendee comments were largely favorable, particularly expressing pleasure with the printed materials collected, reproduced, and distributed by the AID/OSU team.

Another short course was under consideration at the time of this report.

Philippine contact
established

In awareness that the Government of the Philippines had established a National Crop Protection Center

earlier in the year (May), project member Herb Fisher stopped at Manila on the return trip to Oregon from Pakistan to assess possible project involvement.

There appeared to be potential for positive input through support of the weed control systems segment of the program, particularly as it related to non-irrigated rice farming, multiple cropping, and small farmers. At AID's request, the AID-OSU project director travelled to the Philippines to meet with both GOP and USAID/Manila officers to further explore collaboration. A memorandum of understanding was drawn up and preliminary approval gained in February 1977. AID/OSU input would consist of two weed scientists--Philip Motooka and Herb Fisher--plus socio-economic backup by the Corvallis campus, with Dennis O'Brien providing the field component.

The National Crop Protection Center, headquartered at the University of the Philippines Los Banos campus, has seven regional branches located through-out the country. NCPC is charged with planning and developing crop protection research, carrying out training programs, advising governmental officials regarding regulatory programs, undertaking information/extension activities, and establishing linkages between research and operational areas of crop protection.

Priorities listed by NCPC director, Dr. Fernando F. Sánchez, included integrated pest management for rice, corn, vegetables, and grain sorghum, along with training, field surveillance and research. Translating research results into practical information for use by small farmers also has high priority.

Weed effort launches aquatic program

Oregon State University signed a subcontract with the University of Florida (Gainesville)

for UF to undertake an aquatic weed component of the AID weed control systems program. Prof. George Allen assumed leadership of the effort which has a dual goal of helping developing countries to identify researchable aquatic weed problems and serving as a centralized international repository and distribution center for aquatic weed related information.

A formal, large scale technical assistance request was received from the Thailand National Research Council (TNRC) for research and control of aquatic weeds in Thailand. Dr. Allen traveled to southeast Asia in December to contact key individuals and assess the potential of servicing the request. A request was also received from the Coordinating Subcommittee on Aquatic Weeds (CSAW) of the TNRC to conduct a six-week short course and assessment program focusing on aquatic weed problems.

The AID-aquatic weed group responded to the CSAW request by organizing and conducting a Short Course on the Control of Aquatic Weeds and an Assessment of their Economic Significance in Thailand, in Bangkok from March 15-April 15, 1977.

In other travels Dr. Allen visited Sudan, Kenya, Uruguay, and Nicaragua to assess potential aquatic weed problems, establish contacts with Mission personnel and local officials, and collect information relative to generating a data base on aquatic systems in developing countries.

The latter activity is aimed at developing a file of basic physical, hydrological, and environmental parameters of the major water systems in LDCs with current potential for aquatic weed problems. The ultimate objective is to provide a ready source of basic data on countries that have requested, or could request, technical assistance on aquatic matters. A "water body data" sheet has been prepared and information collection has begun using authoritative reference books, published

articles, governmental agencies within specific countries, and various other sources. This year the effort concentrated on countries in, outh-east Asia and Africa.

Outgrowth of socio-economic research in El Salvador

various weed control systems on small, basic grain farmers in El Salvador was formalized in a doctoral dissertation. The study, performed by (now Dr.) Raymundo E. Fonellera (presently Dean of Agriculture at Central Mindanao University in the Philippines), was entitled: The Impacts of Government Market Intervention on Weed Control Technology, Income and Employment - A Case Study of Basic Grain Farmers in El Salvador, Central America.

Socio-economic research carried out earlier on the relationship and impact of

The major conclusions were that the presence of price distortions and off-farm employment alternatives were insufficient to induce changes in weed control technology on small and medium size farms. The most efficient system both from an individual and social point of view was the use of manual weed control. However, large farms appeared to be sensitive to direct and indirect government subsidies with the result that herbicides use was found on 75-87 percent of the total large farm area whenever direct or indirect capital subsidies were in effect.

Brazil Short Course

Weed research specialist Herb Fisher helped organize and present a 2-day weed control short course as part of the Brazilian Enterprise for Agricultural Research (EMBRAPA) 3-week, First National Cassava Production course in Cruz das Almas, Brazil, May 4-6, 1976. The joint effort by Fisher and Dr. Jerry Doll, CIAT, Cali, Colombia, included lectures on basic weed research principles, field weed identification, demonstration and calibration of application equipment, and other information.

Equipment research and development

The project has accelerated work with small equipment related to applying pesticides. Several knapsack style sprayers were obtained for testing, not to compare various brands, but to determine the most effective methods of using, maintaining, and cleaning the units.

Project research technician Frank Fraser developed a method for accurate fabrication of test plot sprayer booms and fabricated a sighting device to simplify laying out research plots with square corners.

Both the fabrication method and sighting device are relatively simple, low-cost, and suitable for use under relatively unsophisticated conditions in developing countries. The fabrication process was reported and illustrated in INFOLETTER.

Project works with Weed control specialist Fisher, at
Pakistan the request of AID/Pakistan, spent
the period of November 9-December 15,
1976, in Pakistan to assist the Pakistan Agricultural Research Council
(PARC) in establishing weed control experiments in wheat, and to work
with personnel of Experience Incorporated, an AID/Pakistan contractor.

A second objective was to investigate feasibility of a future project site for AID-OSU program in Pakistan.

Herbicide Evaluation Trial A screening trial was estab-
Conducted in Oregon lished in Oregon during May 1976
to evaluate 14 experimental her-
bicides from seven chemical companies. Thirty-three crop and weed
species were used to evaluate the herbicides and to generate information
concerning general phytotoxicity and crop selectivity. Representative
commercial herbicides were included in the trial for comparative purposes
to help determine the effectiveness of the new, experimental compounds.
Reports of the results were provided to many public researchers, as well
as the companies involved.

C. DISSEMINATION AND UTILIZATION OF RESEARCH RESULTS

Project publishes two The AID-OSU group published two
major publications major titles (through the Inter-
national Plant Protection Center
at OSU) during the report period: FIELD MANUAL FOR WEED CONTROL RESEARCH;
and A WORLDWIDE CATEGORIZED PARTIAL LISTING FOR MANUFACTURERS OF PESTI-
CIDE APPLICATION EQUIPMENT / UNA LISTA PARCIAL MUNDIAL Y CLASIFICADA DE
FABRICANTES DE EQUIPOS PARA LA APLICACION DE PESTICIDAS.

The illustrated Manual, compiled by project weed specialists Larry C. Burrill and Eduardo Locatelli, along with former project weed control specialist Juan Cárdenas, is intended as a practical information source to help launch, or guide, successful weed control field research. It describes various types of field trials and offers constructive suggestions for minimizing design and operating errors and achieving more useful research results.

The 60-page paperback was published to encourage and expedite improved weed control research. The authors note that, while the primary thrust aims toward researchers relatively new to the discipline, more experienced investigators also may find numerous usable tips.

Sections cover planning, performing, and evaluating weed control field research, as well as the all-important reporting of results. An extensive list of measures, equivalents, conversions, and rates is included as a time-saving aid for researchers.

The text delves into such seemingly mundane matters as reaching agreements with land owners when trials are conducted on private lands. However, as the publication points out, a communication failure between researcher and cooperator can easily nullify months of expensive research effort.

A step-by-step method for laying out plots without instruments is presented (with diagram). Figures, charts, and examples cover a broad spectrum of field research operations. Translation into Spanish is underway with a Spanish version expected to be available in late 1977.

The second title issued presented an extensive list of firms worldwide that manufacture pesticide application equipment, components, and safety gear. The publication, in English and Spanish, has the objective of creating a single source of widely scattered information, thereby serving as a useful reference for entities or individuals (particularly in LDCs) faced with the need for data to support equipment acquisition.

The format includes three major sections: a graphic chart of the more than 120 specific categories of equipment; a listing of firms by name and country under categories headings; and last, an alphabetic listing of firms by and within country with complete addresses. A researcher presumably could use the data to help determine what kind of equipment is needed, who the firms are worldwide that manufacture that item, and then find the addresses needed to initiate correspondence.

The publication is based on a continuing file maintained by the project/IPPC at OSU. The file, originally established in 1970, has grown to include over 500 firms and has been revamped in the last two years to facilitate electronic data processing.

Another use of the publication, or the file, is in connection with construction of specialized equipment for research. A research station wishing to construct its own plot sprayer needing a specific size and type of hose clamp which may not be available locally can turn to the publication which lists 26 firms in four countries offering hose clamps.

Five issues of the IPPC INFOLETTER, a free periodical issued through IPPC with project support, were published during the report period. Content continued to emphasize a variety of topics related to weed control technology and deemed useful to readers in developing countries.

INFOLETTER distribution includes nearly 4,000 recipients in more than 120 countries (Appendix II).

A sampling of news items that appeared in INFOLETTER during the report period includes:

Weed control: big benefits for Turkey's wheat
Visitors to PRC encounter little weed research
Weeds, weed control, and energy
AID/OSU weed program adds aquatics
Application equipment file expanded, computerized
Rice, weeds, and CIAT
New manual focuses on weed research
Weed control technology and small farms
AID to sponsor training course

Each issue also contains an "in print" section presenting information on current print materials related to weed technology, as well as a calendar of forthcoming conferences, seminars, and short courses.

An additional feature in nearly every issue focuses on equipment that might be of use and interest in LDCs such as a manually pushed seeder, an inexpensive pail pump, a wind-powered water pump, a hand-held granule spreader, a knapsack sprayer, and a knapsack duster. No brand names appear in these articles, but a statement printed with each feature offers to provide manufacturer names and addresses in response to requests. During the year 21 items were mentioned; over 150 inquiries for equipment information were received from 17 countries. Many inquiries requested information on more than one item.

All incoming requests were counted and analyzed for one (possibly average) week, March 28 through April 1, 1977. The results were:

Requests received for IPPC/project publications: 43
Total number of copies of publications requested: 222
Requests for information about publications: 10
Requests for information on equipment mentioned in INFOLETTER: 8
Requests for special information: 5
Mailing list address changes, additions, or deletions: 9

The requests were received from: India, Ethiopia, Singapore, New Zealand, USA, Canada, Belgium, Guatemala, England, Ireland, Philippines, Taiwan/ROC, Jamaica, Switzerland, Nicaragua, Mariana Islands, Colombia, Dominican Republic, Italy, Indonesia, Costa Rica, Mexico, Brazil, Senegal, Uruguay, Thailand, Malaysia, Honduras, El Salvador, Argentina, Panama, and Ecuador.

A library review was performed at Corvallis to assist CATIE in obtaining an up-to-date list of weed science control information sources.

The AID/OSU team in Costa Rica has received a request to assist the new Panamanian National Agricultural Research Institute. Details of the nature of the response had not been formalized at the time of this report.

Other Information Activities

More than 3,300 copies of nine publications were distributed during the report period. A country-by-country analysis is presented in Appendix III, World Distribution of Publications.

Interest in IPPC Papers, a series of free reprints concerning weed control, continued to be strong as well over 700 copies were distributed in response to requests. Several new titles were added including Weed Control Problems Causing Major Reductions in World Food Supplies, as well as the Spanish and French versions of the same paper.

Support for IWSS Activities

Project resources were utilized to assist the International Weed Science Society (IWSS) in continuing to organize, elect officers, prepare and disseminate a multi-lingual newsletter, and generally move toward its objectives of increased international linkage and information sharing. Membership increased to nearly 400 individuals and firms.

Other Activities Related to Technical Assistance

Project support agronomist Larry Burrill visited several research and technical institutions in India, Pakistan, U.K., and Indonesia, as well as FAO/Rome. He also attended numerous professional conferences.

Various other project personnel also traveled to countries in Asia and Latin America.

Requests for Assistance

The project received requests to supply personnel to work with FAO in Argentina, and to assist the USAID mission in Ghana. An affirmative reply was tendered in both cases.

The flow of letters requesting various items of information-assistance with weed problems, data on herbicides, names of individuals--continued unabated. Every inquiry receives attention and a response of some sort, often including published materials supplied at no cost to the LDC requestor.

As an example, a world bank advisor stationed at Central Mindanao University contacted the project and indicated that weed research/control literature available at CMU was virtually nil and urgently needed. Copies of all project (or IPPC) publications were promptly supplied as well as an assortment of useful texts purchased by the project for this purpose.

Aquatic Weed Information Program gets Underway

A general information services and data repository effort began functioning at the University of

Florida in conjunction with the aquatic weed subcontract. An aquatic weed reference center at UF now includes nearly 7,000 references plus numerous other citations in process. Over half the cataloged references have been processed for entry into a computerized system. The aquatic weed group has compiled a list of the approximately 4,000 aquatic plant species.

The information activity also services requests for information received worldwide. Copies of reprints, or literature, as well as references or other information are provided in response to the requests received. Requests were received from individuals or institutions in India, Mozambique, Brazil, Nigeria, and Nepal, among others.

D. WORK PLAN FOR THE COMING YEAR

1. COSTA RICA PROJECT

- A. Mount full-scale program of field plots conforming with the local planting season;
- B. Participate in future weed control short courses as requested;
- C. Continue to interface closely with colleagues and counterparts within the structure of CATIE and ROCAP;
- D. Travel to other Central American or Caribbean nations, as requested, for consultation and advising.

2. PHILIPPINES PROJECT

- A. Commence field plot trials in upland food crops based on the various local planting seasons;
- B. Establish linkages with personnel at the National Crop Protection Center, the International Rice Research Institute, and various institutions and experiment stations within the country.

3. SOCIO-ECONOMIC COMPONENT

- A. Carry out field work, sampling and taking questionnaires on small farms in Costa Rica and the Philippines;
- B. Provide back-up advising and consultation on socio-economic aspects.

4. AQUATIC WEEDS COMPONENT

- A. Organize and present an aquatic weed short course in Thailand;
- B. Continue to expand and operate the aquatic weed information and resource facility at the University of Florida;
- C. Expand the inventory profiling countries with potential aquatic weed problems.

5. SUPPORTING EXPERIMENTS

- A. Carry out investigation on the use and economics of "knapsack" style sprayers, as well as other equipment geared to the needs of smaller farmers in developing countries;
- B. Continue limited herbicide screening experimentation on new products as well as new uses for existing products.

6. INFORMATION ACTIVITIES

- A. Publish a Spanish language version of FIELD MANUAL FOR WEED CONTROL RESEARCH;
- B. Publish a revised and up-dated version of the BIBLIOGRAFIA PARCIAL DE INVESTIGACION SOBRE MALEZAS Y SU CONTROL PARA AMERICA DEL SUR, AMERICA CENTRAL, EL CARIBE Y MEXICO;
- C. Publish and disseminate no less than four issues of the IPPC INFOLETTER;
- D. Continue to field requests for, and distribute, copies of existing IPPC and project publications;
- E. Continue to respond to requests for other information.

7. OTHER ACTIVITIES

- A. Continue to stand in readiness to respond affirmatively to requests for on-site assistance, advising, or consultation in LDCs.

E. INVOLVEMENT OF MINORITY PERSONNEL AND WOMEN

During the present reporting year the project employed 15 individuals on a half-time, or better, basis. Five were female. One weed specialist of Spanish extraction was employed.

Past and planned activities include efforts to widely publicize any opportunities with the program. All qualified candidates will be considered for any vacant positions.

F. SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC.

Appropriate forms have been filed with the Smithsonian Science Information Exchange, Inc.

G. STATEMENT OF EXPENDITURE AND OBLIGATIONS AND CONTRACTOR RESOURCES

The following tables list the expenditures and obligations related to the four broad work areas of the project during the period April 1, 1976, through March 31, 1977.

WEED CONTROL SYSTEMS FOR REPRESENTATIVE FARMS IN DEVELOPING COUNTRIES (AID/ta-C-1295)

Classification	Corvallis: Head- quarters	Central America	Southeast Asia	Corvallis: Publications	Line Totals
Salaries and Wages	\$59,129.25	\$11,343.33	--	\$ 4,383.64	\$74,856.22
Fringe Benefits	8,709.53	1,926.95	--	660.38	11,296.86
Indirect Costs					
On-campus	29,460.40	--	--	2,086.53	31,546.93
Off-campus	--	4,909.50	930.18	--	5,839.68
Total	29,460.40	4,909.50	930.18	2,086.53	37,386.61
Allowances	--	2,246.05	--	--	2,246.05
Travel and Transportation	459.86	13,569.15	5,521.68	--	19,550.69
Other Direct Costs	1,493.80	306.89	164.48	--	1,965.17
Equipment, Vehicles, Materials and Supplies	1,425.68	6,602.46	4,696.81	--	12,724.95
Totals	100,678.52	40,904.33	11,313.15	7,130.55	160,026.55

CONFIDENTIAL

This page should be removed before the 1976-77 Annual Report is circulated outside the Agency for International Development.

WEED CONTROL SYSTEMS UTILIZATION FOR REPRESENTATIVE FARMS IN DEVELOPING COUNTRIES (AID/ta-C-1303)

Classification	Corvallis: Head- quarters	Central America	Southeast Asia	Corvallis: Publications	Line Totals
Salaries and Wages	\$56,695.06	\$12,312.08	--	\$22,396.18	\$91,403.32
Fringe Benefits	8,587.24	2,082.54	--	3,374.54	14,044.32
Indirect Costs					
On-campus	27,123.02	--	--	11,749.15	38,872.17
Off-campus	--	4,862.18	383.71	--	5,245.89
Total	27,123.02	4,862.18	383.71	11,749.15	44,118.06
Differential and Allowances	--	2,567.93	--	--	2,567.93
Travel and Transportation	3,974.40	5,452.14	1,855.07	250.79	11,532.40
Other Direct Costs	727.09	604.55	3.75	102.55	1,437.94
Equipment, Vehicles, Materials and Supplies	2,137.97	5,336.19	4,487.00	5,117.66	17,078.82
Sub-Contract	19,170.0 *	--	--	--	19,170.00
Totals	118,414.78	33,217.61	6,729.53	42,990.87	201,352.79

*University of Florida aquatic weed program.

APPENDIXES

APPENDIX I—BIBLIOGRAPHIC LIST

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APPENDIX II—DISTRIBUTION OF INFOLETTER

Abu Dhabi 1	Guyana 2	Saudi Arabia 7
Aden 1	Haiti 3	Scotland 4
Afghanistan 15	Honduras 36	Senegal 12
Algeria 2	Hong Kong 4	Seychelle Islands 2
Angola 2	Hungary 4	Sierra Leone 4
Antigua 2	India 170	Singapore 15
Arab Rep. of Egypt 9	Indonesia 86	Solomon Islands 2
Argentina 217	Iran 11	Somali 1
Australia 60	Iraq 2	South Vietnam 11
Austria 5	Ireland 7	Spain 13
Bahamas 1	Israel 18	Sri Lanka 12
Bangladesh 4	Italy 25	Sudan 9
Barbados 2	Ivory Coast 5	Surinam 4
Belgium 12	Jamaica 10	Swaziland 2
Belize 9	Japan 52	Sweden 14
Benin 1	Jordan 8	Switzerland 27
Bermuda 1	Kenya 27	Syria 2
Bolivia 25	Korea 11	Tahiti 3
Botswana 3	Laos 7	Taiwan 17
Brazil 181	Lebanon 7	Tanzania 13
Brunei 3	Lesotho 2	Thailand 41
Bulgaria 2	Liberia 8	Togo 1
Burma 3	Libya 1	Trinidad 16
Cameroon 4	Malagasy Rep. 1	Trucial States 1
Canada 105	Malawi 5	Tunisia 4
Canary Islands 1	Malaysia 57	Turkey 15
Central African Rep. 1	Mali 1	Uganda 4
Chad 3	Malta 3	Upper Volta 2
Chile 38	Mauritania 1	Uruguay 19
Colombia 168	Mauritius 2	USSR 4
Comores Islands 2	Mexico 122	United States 1,195
Costa Rica 58	Morocco 3	Canal Zone 4
Cuba 1	Mozambique 2	Caroline Isl. 1
Cyprus 3	Nepal 3	Guam 2
Czechoslovakia 9	Netherlands 16	Mariana Isl. 2
Denmark 10	New Caledonia 4	Puerto Rico 16
Dominican Rep. 1	New Guinea 15	Samoa 1
DDR 1	New Hebrides 2	Virgin Isl. 1
Ecuador 47	New Zealand 21	Venezuela 49
El Salvador 19	Nicaragua 31	West Germany 39
England 116	Nigeria 29	Western Samoa 7
Ethiopia 21	Norway 10	Yemen 1
Fiji 4	Pacific Islands 2	Yugoslavia 5
Finland 8	Pakistan 16	Zaire 3
France 27	Panama 24	Zambia 3
Gabon 1	Paraguay 8	TOTAL 3,973
Gambia 4	Peru 73	
Ghana 23	Philippines 81	
Greece 2	Poland 9	
Guatemala 31	Portugal 4	
Guinea 1	Romania 2	

APPENDIX III—WORLD DISTRIBUTION OF PUBLICATIONS

Key to Titles

- 1/ Aquatic Weeds: MALEZAS ACUATICAS/AQUATIC WEEDS.
- 2/ Clima Frio: MALEZAS DE CLIMA FRIO/WEEDS OF A COOL CLIMATE.
- 3/ Field Manual: FIELD MANUAL FOR WEED CONTROL RESEARCH.
- 4/ PWOCA: MALEZAS PREVALENTES DE AMERICA CENTRAL/PREVALENT WEEDS OF CENTRAL AMERICA.
- 5/ Status Report: EXPERIMENTAL HERBICIDES, STATUS REPORT BY CROP, 1975..
- 6/ Tropical Weeds: TROPICAL WEEDS/MALEZAS TROPICALES.
- 7/ Trucos: ALGUNOS "TRUCOS" UTILES IN ESTADISTICA/SOME USEFUL TRICKS IN STATISTICS.
- 8/ Weed Seeds: SEMILLAS DE MALEZAS TROPICALES I Y II/TROPICAL WEED SEEDS I AND II.
- 9/ WW List: A WORLDWIDE CATEGORIZED PARTIAL LISTING FOR MANUFACTURERS OF PESTICIDE APPLICATION EQUIPMENT/UNA LISTA PARCIAL MUNDIAL Y CLASIFICADA DE FABRICANTES DE EQUIPOS PARA LA APLICACION DE PESTICIDAS.

Country	Aquatic	Clima	Field	PWOCA	Status	Tropical	Trucos	Weed	WW List
	Weeds	Frio	Manual		Report	Weeds		Seeds	
	1/	2/	3/	4/	5/	6/	7/	8/	9/
Afghanistan	1	--	1	1	--	--	--	1	1
Argentina	1	2	1	14	1	--	23	1	13
Australia	2	1	3	2	--	--	--	--	15
Austria	--	--	--	--	--	--	--	--	4
Bangladesh	3	--	--	--	--	3	--	--	--
Barbados	1	1	4	1	--	--	1	1	1
Belgium	--	--	--	--	--	--	--	--	11
Belize	1	--	4	4	--	--	--	1	5
Bolivia	1	3	1	2	2	2	4	3	2
Brazil	7	5	5	38	--	1	12	45	11
Canada	2	--	22	5	--	--	--	1	40
Canal Zone	10	1	--	1	--	--	--	1	1
Chile	--	1	--	3	1	--	2	1	6
Colombia	2	--	6	16	--	--	19	7	13
Costa Rica	2	2	43	85	2	1	5	3	2
Cuba	--	--	--	1	--	--	--	--	--
Czechoslovakia	--	--	2	--	--	--	--	--	1
Denmark	--	--	2	1	--	--	--	--	13
Dominican Rep.	--	--	--	--	--	--	2	--	3
DDR	--	--	1	--	--	--	--	--	1
Ecuador	--	--	1	4	--	1	11	4	2
El Salvador	2	1	1	6	--	--	--	--	7
England	--	--	18	6	--	--	--	--	79
Ethiopia	--	--	2	1	--	--	--	--	1
Fiji	1	--	--	--	--	--	--	2	1
Finland	--	--	--	--	--	--	--	--	5
France	1	--	2	1	--	--	--	--	36
Gambia	--	--	--	--	--	--	--	--	1
Ghana	1	--	3	1	--	--	--	--	1
Greece	1	--	1	1	--	--	--	2	4
Guatemala	3	3	--	5	1	--	1	3	8
Guyana	1	--	--	1	--	--	--	1	--
Honduras	--	2	1	9	1	--	3	10	9
Hong Kong	--	--	--	1	--	--	--	--	2
Hungary	--	--	--	1	--	--	--	4	1
India	3	3	64	20	2	1	2	13	26
Indonesia	1	--	8	1	--	--	--	3	6
Iran	--	--	--	--	--	--	--	--	2
Ireland	--	--	--	1	--	--	--	--	2
Israel	--	--	3	--	--	--	--	--	7
Italy	--	--	4	1	--	--	--	--	56
Japan	--	--	7	--	--	--	--	--	36
Jordan	--	--	1	--	--	--	--	--	3
Kenya	--	--	1	--	--	--	--	--	5
Korea	--	--	--	--	--	--	--	--	2
Liberia	--	--	1	--	--	--	--	--	2
Malawi	--	--	--	--	--	--	--	--	1
Malaysia	--	--	8	--	1	--	--	--	3

Country	Aquatic Weeds	Clima Frio	Field Manual	PWOCA	Status Report	Tropical Weeds	Trucos	Weed Seeds	WW List
Mali	1	--	4	--	--	--	--	--	--
Mexico	13	13	11	124	1	1	5	108	17
Mozambique	--	--	--	1	--	--	--	--	--
Nepal	1	--	1	1	--	--	--	3	2
Netherlands	--	--	3	--	--	--	--	--	16
New Caledonia	--	--	1	--	--	--	--	--	--
New Zealand	--	--	7	--	--	--	--	--	1
Nicaragua	3	3	3	21	3	--	3	5	4
Nigeria	--	--	4	1	--	--	--	1	6
Norway	--	--	1	--	--	--	--	--	3
Panama	--	--	--	--	--	--	--	--	2
Paraguay	2	--	--	--	--	--	--	--	--
Peru	1	1	32	6	--	--	9	3	1
Philippines	9	2	59	8	--	2	1	9	36
Portugal	--	--	--	--	--	--	--	--	2
Puerto Rico	1	--	--	4	1	3	3	3	1
Rhodesia	--	--	1	--	--	--	--	--	--
Romania	--	--	--	--	--	--	--	--	1
Saudi Arabia	1	--	1	1	--	--	1	2	2
Scotland	--	--	1	--	--	--	--	--	--
Senegal	--	--	--	1	--	--	--	--	1
Solomon Islands	--	--	1	--	--	--	--	--	--
South Africa	--	--	--	--	--	--	--	--	1
Spain	--	--	2	--	--	--	--	--	16
Sri Lanka	--	--	--	--	--	--	--	--	1
Sweden	--	--	1	--	--	--	--	--	10
Switzerland	--	--	8	--	--	--	--	--	20
Syria	2	--	2	1	--	--	--	20	2
Taiwan	--	--	--	--	--	--	--	--	4
Thailand	--	--	3	--	--	--	--	2	5
Trinidad	1	1	1	4	--	--	1	4	--
Turkey	--	--	2	1	--	--	--	--	3
Uruguay	--	1	2	1	--	--	4	6	4
United States	33	9	544	71	1	1	8	35	498
Venezuela	2	1	--	3	1	--	5	9	13
West Germany	6	1	19	3	--	--	--	3	41
Western Samoa	--	--	1	1	--	--	--	5	3
Yugoslavia	--	--	--	--	--	--	--	--	1
Zambia	1	--	1	2	--	--	--	1	2
TOTALS	124	57	937	489	18	16	125	326	1,170

APPENDIX IV—PROJECT PERSONNEL

CHRISTIE ANDERSON, Corvallis, Clerical Specialist, April 1, 1976 to March 31, 1977.	R/TA
ARNOLD P. APPLEBY, Corvallis, Weed Control Specialist, 25% FTE, April 1, 1976 to June 30, 1976.	TA
LARRY C. BURRILL, Corvallis, Weed Research Specialist/Support Agronomist, April 1, 1976 to March 31, 1977.	R/TA
RICHARD L. CHASE, Corvallis, Weed Research Specialist, 50% FTE, September 1, 1976 to March 31, 1977.	TA
FRANK S. CONKLIN, Corvallis, Agricultural Economist, 50% FTE, September 1, 1976 to March 31, 1977.	R
ALLAN DEUTSCH, Corvallis, Information/Administration, April 1, 1976 to March 31, 1977.	R/TA
HERBERT H. FISHER, Corvallis, Weed Research Specialist, July 1, 1976 to March 31, 1977.	R
FRANK FRASER, Corvallis, Technician, April 1, 1976 to March 31, 1977.	R/TA
CAROLYN JOHNSON, Corvallis, Secretary, 50% FTE, October 1, 1976 to March 31, 1977.	R
GEORGENA S. KNAPP, Corvallis, Fiscal/Translation, April 1, 1976 to March 31, 1977.	R/TA
EDUARDO LOCATELLI, Corvallis and Costa Rica, Weed Research Specialist, May 1, 1976 to March 31, 1977.	TA
STANLEY F. MILLER, Corvallis, Director and Agricultural Economist, 50% FTE, April 1, 1976 to March 31, 1977.	R/TA
DENNIS O'BRIEN, Corvallis, Agricultural Economist, 50% FTE, September 1, 1976 to March 31, 1977.	R
MYRON SHENK, Corvallis and Costa Rica, Weed Research Specialist, July 1, 1976 to March 31, 1977.	R
MYRNA WADE, Corvallis, Secretary, April 1, 1976 to March 18, 1977.	R/TA
CAROLYN A. WALLS, Corvallis, Secretary, March 10, 1977 to March 31, 1977.	R/TA
DOUGLAS L. YOUNG, Corvallis, Agricultural Economist, 75% FTE, September 1, 1976 to October 31, 1976.	R

* R = research, TA = technical assistance
FTE = full-time equivalent