4 9310463 (2)
PD-AAC-778-B1

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I

1. TRANSACTION CODE: A (A. ADD / C. CHANGE / D. DELETE)

2. DOCUMENT CODE: 5

3. COUNTRY/ENTITY: DS/AGR/FCP RDA-28
Type a. Research

4. DOCUMENT REVISION NUMBER: 4

5. PROJECT NUMBER (7 digits): 931-0463.11

6. BUREAU/OFFICE: A. SYMBOL: DSB B. CODE: 10

7. PROJECT TITLE (Maximum 40 characters): Weed Control Systems in LDCs 628.

8. PROJECT APPROVAL DECISION — ACTION TAKEN: A. APPROVED / B. DISAPPROVED / DE. DEAUTHORIZED

9. EST. PERIOD OF IMPLEMENTATION (For 3 yr. extensio
YRS. 03 MOS. 0

10. APPROVED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. COD. C. GRANT	D. LOAN	C. THRU 7/30/78 E. GRANT	F. LOAN	H. FY 79 G. GRANT	I. LOAN	K. 2ND FY 80 J. GRANT	L. LOAN
(1) FN	121I	973	-	3,310	-	306	-	311	-
(2)									
(3)									
(4)									
TOTALS				3,310	-	306	-	311	-

A. APPROPRIATION	M. 3rd FY81 G. GRANT	H. LOAN	N. 4th FY82 G. GRANT	I. LOAN	LIFE OF PROJECT G. GRANT	H. LOAN
(1) FN	362	-	0	-	4,289	-
(2)						
(3)						
(4)						
TOTALS	362	-	0	-	4,289	-

PROJECT FUNDING — ENTER APPROPRIATE CODE: 1. LIFE OF PROJECT 2. INCREMENTAL LIFE OF PROJECT: 1 -

3. PROJECT FUNDING AUTHORIZED THRU: 81

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED ($000)

A. APPROPRIATION	B. ALLOTMENT REQUEST NO. C. GRANT	D. LOAN
(1) N/A		
(2)		
(3)		
(4)		
TOTALS		

13. FUNDS RESERVED FOR ALLOTMENT: N/A

TYPED NAME (Mr., Mrs., Ms.) FIRST INITIAL

SIGNATURE

DATE

14. SOURCE/ORIGIN OF GOODS AND SERVICES: ☐ 000 ☐ 941 ☐ LOCAL ☐ OTHER

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED
This amendment extends the life of this research project by three (3) years (from June 1, 1979 to May 31, 1982) requiring funds totaling $979,000 for the three-year period.

PP 12/01/78

FOR AID/W USE: 16. ACTION OFFICE SYMBOL | 17. ACTION DATE MO DA YR | 18. ACTION REFERENCE (Original) | ACTION REFERENCE

MAR 20 1979

ACTION MEMORANDUM FOR THE DEPUTY ASSISTANT ADMINISTRATOR FOR FOOD AND NUTRITION, BUREAU FOR DEVELOPMENT SUPPORT

FROM: DS/AGR, Dean F. Peterson

Problem: Your authorization is required for a three-year extension of the research project "Weed Control Systems in the LDCs" requiring total funds of $979,000.

Discussion: Weeds cause serious yield losses in LDCs. While less visible than losses from many insects and diseases, yield reductions from weed competition are far more widespread. It is estimated that losses from weeds commonly average 25% where traditional hand removal and/or tillage methods are used. Weeds are most competitive with crops during the first three-to-six weeks after planting. Small farmers, most of whom depend on family labor, are unable to remove the weeds before they reduce yields. Furthermore, the labor required for weeding (often 50% of the total for crop production) limits the area a family can plant. In addition many perennials and parasitic weeds such as Striga species cannot be controlled by traditional LDC methods.

Research on weed control in LDCs was started under an A.I.D. contract by Oregon State University (OSU) in 1966. Originally conducted in South America, the work during the past two-years has been divided between Central America and the Philippines.

The project has been highly successful in identifying weed problems, conducting adaptive research to solve them and training research counterparts in several countries. A system developed in Costa Rica involves killing the large perennial grasses with a translocated herbicide that is immediately inactivated in the soil. The farmer then plants his crop through holes made in the dead grass which suppresses annual weeds and serves as a mulch to conserve moisture and prevent erosion. The hand weeding that is needed can then be done at the proper time by his family.

A three-year renewal of this project is aimed to solve additional problems such as the rapidly spreading itchgrass (Rottboellia exaltata) and to continue the training of research counterparts. The problems are so many that only a few can be researched at one time.

When introducing new technology for weed control, the social and economic aspects must be considered. If off farm labor is used for control, the impact of introducing less labor intensive methods must be considered.

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

ENTITY :Bureau for Development Support

PROJECT :Weed Control Systems in LDCs

PROJECT NUMBER :931-0463.11

1. I hereby authorize grant funds totaling $979,000 for a three-year extension (from June 1, 1979 to May 31, 1982) of the research project "Weed Control Systems in the LDCs" with Oregon State University.

2. This three-year extension will be incrementally funded in FY 1979 with $306,000 for the first extension year, in FY 1980 with $311,000 for the second year, and in FY 1981 with $362,000 for the third year depending on the availability of funds.

3. This three-year research extension was reviewed and endorsed by RAC at its January 29-30, 1979 meeting.

4. On March 1, 1979 an Environmental Threshold Determination was made to the effect that this extension was not a major federal action which would have a significant effect on the human environment.

Tony Babb
Deputy Assistant Administrator
for Food and Nutrition
Bureau for Development Support

Date: April 3, 1979

Clearances:
DS/AGR/FCP:GWarren
DS/AGR/FCP:KMByergo
DS/AGR:MMozynski
DS/AGR:DPeterson
DS/PO:RRogers
DS/PO/RES:MRechcigl
DS/PO:RSimpson

References:
Action Memo: Peterson,DS/AGR to Babb DAA/DS/FN (attached)
Project Paper-Research Project Statement (attached)

Studies of labor and capital inputs for weed control have been made in Central and South America and in the Philippines. The situation varies greatly in different locations depending on whether off farm labor is used and, if so, on alternate opportunities for these workers. Economic research will be conducted in new areas and the potential for and possible impact of new weed control technologies are to be determined.

This three-year extension was reviewed and endorsed by RAC at their meeting on January 29-30, 1979.

Recommendation: That you approve the three-year research project extension by signing the attached PAF.

Attachment
A/S

Clearances:
DS/AGR/FCP:GWarren
DS/AGR/FCP:RMByergo
DS/AGR:MMozynski
DS/PO:RSimpson 3/26

Addendum: The most recent project evaluation, conducted August 21, 1978 - August 23, 1978 is attached. The review committee recommended that the project be extended for 2 or 3 years with several modifications as listed in the PES.

Minutes of the DSB Project Review Committee which met on December 13, 1978 are attached. (No TPCA review was conducted.) On page 2, paragraph 2 of the minutes of the DSB Review, a recommendation is made regarding the economic and social analyses studies. In response to this recommendation, Drs. Stanley Miller and Frank Conklin met in Washington, D. C. on January 4 and 5 with Drs. John Day and Joachim Elterich of DS/AGR/ESP. The project was revised following their discussions. Drs. Day and Elterich are continuing to work with the Oregon State University staff on the development of research procedures for the socioeconomic studies.

Attachments 2
1. PES (Part 1) 4 copies
2. DSB Proj Rev Com Mtg Minutes
   4 copies

FROM: DAA/DS/FN, T. Babb December 13, 1978

SUBJECT: OFFICIAL MINUTES OF THE DSB PROJECT REVIEW COMMITTEE MEETING held December 7, 1978 to Review the DS/AGR Project; WEED CONTROL SYSTEMS IN LDCs, 931-0463

DISTRIBUTION/
ATTENDEES*:

DAA/DS/FN, Mr. T. Babb*
DS/AGR, Mr. D. Peterson
DS/AGR, Mr. K. Byergo*
DS/AGR, Mr. J. Malcolm*
DS/AGR, Ms. M. Mozynski*
DS/PO, Mr. B. Simpson
DS/PO, Mr. B. Chapnick
DS/PO, Mr. K. Milow
DS/PO, Mr. R. Rogers*
DS/PO/RES, Mr. M. Rechcigl*
DS/PO/RES, Mr. F. O'Quinn*
DS/PO, Mr. P. Gage*
AFR/DR, Mr. J. Koehring
ASIA/TR, M. A. Doyle
ASIA/TR, Mr. P. Newberg*
NE/TECH, Mr. E. MacManus
NE/TECH/AD, Mr. V. Lateef*
LAC/DR, Mr. W. Feldman
LAC/DR/RD, Mr. B. Allen*
PPC/PDPR, Mr. E. Hogan
PPC/PDPR/RD, Mr. D. Caton*

The project manager opened the discussion by providing a brief history of activities under the project. Implementation commenced with work in Brazil, Columbia and Ecuador; then in 1976 work under the project moved to Costa Rica and the Philippines. At the same time the project was split into two seperate entities, one directed at research and the other at technical assistance. To date work in the Philippines has spanned one crop season and two in Costa Rica. In addition a sub-project is being carried out by the University of Florida in aquatic weed control.

The project has had a positive impact on Latin America programs having trained counterparts, produced technical documents and answered many questions. On the other hand there has been little impact on Africa region programs. It was suggested some linkage with the Africa region be established, perhaps through the international agriculture research centers (IARCs) located on the continent The Near East Bureau representative believed there was little benefit for the Near East Region. However, benefits could be generated for that region from the companion technical assistance project.

No further extensions of the project are envisaged by DS/AGR since a Collaborative Research Support Program (CRSP) in the area of pest management, which will include work on weed control, is scheduled for implementation in FY 1980. The extension under review is the result of an unsolicited proposal, as was the intitial project.

It was noted that the International Plant Protection Center (IPPC), established at Oregon State University under the subject project, relied solely upon AID support for its existence. However, the expertise developed will probably continue to be drawn upon by AID under CRSP.

At the RAC review in January 1976, the committee recommended a reorientation of the project to include social and economic analysis. As a result, the project paper contains an extensive list of studies to be carried out, and Oregon State University is actively recruiting two economists who will be assigned to each one of the project implementation sites. The areas of economic and social analyses were crtitcised as being overly ambitious; it was recommended that the areas of study be prioritised, and reduced to a managable number.

Actions:

Linkages with the IARCs will be explored and/or established; it was recommended that the DS/AGR Crops division establish a close tie-in with the DS/AGR Economic and Sector Planning division to assist with project development and monitoring; and, it was decided to send the project to RAC for review.

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PP

2. DOCUMENT CODE: 3

3. COUNTRY ENTITY: DS/AGR RDA 28 Type : Research

4. DOCUMENT REVISION NUMBER: 4

5. PROJECT NUMBER (7 digits): 931-0463.11

6. BUREAU/OFFICE: A. SYMBOL: DSB; B. CODE: 10

7. PROJECT TITLE (Maximum 40 characters): Weed Control Systems in LDCs

8. ESTIMATED FY OF PROJECT COMPLETION: FY 82

9. ESTIMATED DATE OF OBLIGATION (For 3 Yr. Extens
A. INITIAL FY: 79
B. QUARTER: 2 (Enter 1, 2, 3, or 4)
C. FINAL FY: 81

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 - (For 3 Yr. Extension)

A. FUNDING SOURCE	FIRST FY 79 B. FX	C. L/C	D. TOTAL	LIFE OF PROJECT E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	325	-	325	979	-	979
(GRANT)	325	-	325	979	-	979
(LOAN)						
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY						
OTHER DONOR(S)						
TOTALS	325	-	325	979	-	979

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	D. LOAN	E. thru 9/30/78 F. GRANT	G. LOAN	H. 1st yr. 79 I. GRANT	J. LOAN	K. 2nd yr. L. GRANT	M. LOAN
(1) FN	121I	973	-	3,310	-	325	-	200	-
(2)									
(3)									
(4)									
			TOTALS	3,310	-	325	-	200	-

A. APPROPRIATION	N. 3rd FY 81 O. GRANT	P. LOAN	Q. 4th FY 82 R. GRANT	S. LOAN	LIFE OF PROJECT T. GRANT	U. LOAN
(1) FN	454	-	0	-	4,289	-
(2)						
(3)						
(4)						
TOTALS	454	-	0	-	4,289	-

12. IN-DEPTH EVALUATION SCHEDULE: MM YY 0 9 8 0

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: L. K. McDermott, for

TITLE: Dean F. Peterson
Director, Office of Agriculture
Development Support Bureau

DATE SIGNED: MM 12 DD 01 YY 78

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-78)

PROJECT STATEMENT

December 1, 1978

1. Project Summary.

A. Statistical

Project Title:	Weed Control Systems for Representative Farms in Developing Countries - AID/CM/ta-C-73-23
New or Extension:	Extension - 3 years
Current Contractor:	International Plant Protection Center (IPPC), Oregon State University, Corvallis, Oregon 97331
Principal Investigator:	Stanley F. Miller, IPPC Director
Duration:	Current Contract - April 1, 1976 to March 31, 1979
	Proposed Contract - April 1, 1979 to March 31, 1982
Funding to 9/30/78	$3,370,000
Estimated Additional Funding:	$979,000 to March 31, 1982
Funding Required - April 1, 1979 to March 31, 1980	$306,315
April 1, 1980 to March 31, 1981	310,527
April 1, 1981 to March 31, 1982	361,759
Project Manager:	Dr. G. F. Warren

PROJECT DESCRIPTION SUMMARY

Since 1966, the Agency for International Development (AID) and Oregon State University, working through the International Plant Protection Center (IPPC), have jointly conducted an important and highly regarded weed control program. A single research contract for this effort existed until 1976 when technical assistance was placed under a separate contract. Research focused on developing and evaluating weed control systems for representative farms in developing countries while technical assistance, the companion contract, provided assistance and support to the international weed science community including workers concerned with aquatic weeds. Both contracts terminate March 31, 1979.

Adequate food production continues as a major world problem. A recent world food production resurgence generated complacent attitudes. However, increasing demand for food, uncertain weather, and poorly planned governmental food policies still exist and virtually assure periodic food crises, in the future.

Weeds constitute a worldwide problem. Crop losses due to weeds often exceed 25 percent; uncontrolled weeds can cause complete crop failure. New or more intense use of agricultural inputs often increases weed problems. Certain mechanization of weed control technologies, however, may cause severe social dislocation through loss of jobs, and subsequent reduced income. Selecting appropriate weed control technology which minimizes adverse effects and is consistent with small farms resource endowments requires care and sensitivity.

Progress achieved in Central America has been encouraging. Research in Costa Rica indicates that use of a chemical mulch in seedbed preparation may lead to a major improvement in small farm weed control. Cost reductions have ranged from 28 to 67 percent compared to traditional practices. Labor dislocations appear to be minimal. This and similar project research activities indicate exciting potentials, but also require extensive testing.

A project is proposed--commencing April 1, 1979 and terminating March 31, 1982--to continue ongoing weed control systems research for small farms in developing countries. Both agronomic and socio-economic dimensions will be investigated. The work will be conducted in Costa Rica, the Philippines, and at the contractor headquarters. A complimentary technical assistance proposal is being processed concurrently. Both are essential to meet the need for improved weed control procedures and economic welfare of small farmers in developing countries.

I. PROJECT DESCRIPTION

A. Background

During the next decade, the world will doubtlessly experience globally significant food production pressure. A recent resurgence of world food production has generated a complacent attitude. However, relentlessly increasing demand for food, uncertain weather, and poorly

planned governmental food policies--basic ingredients of the problem--still exist. Continuing food shortfalls are thus assured.

Food problems, magnified in the developing world, fall more heavily on the urban and rural poor. Conception and implementation of more effective agricultural development strategies and production technologies oriented toward developing countries become imperative.

Agricultural development occurs as relatively abundant--hence cheap--factors are substituted for relatively scarce--therefore expensive--production factors. Factor endowments differ in various world regions. A relatively inelastic labor supply in the United States contrasts with abundant land. The developing world usually sustains abundant labor while capital and, at times, land are limited. To be effective and realistic, technologies developed must reflect these endowment differences and provide opportunity for use intensification and substitution of relatively cheap production factors.

1. Weeds and Weed Control

Weeds and the technologies to control them characterize the dilemma facing developing countries. On one hand, improved weed control appears to be necessary, in many situations, to achieve production increase goals. On the other hand, traditional weed control employs a considerable amount of manual labor which may have few employment alternatives. Left uncontrolled, weeds have the potential to cause complete crop failure. On small farms, in spite of control efforts, weed losses often exceed 25 percent. The introduction of irrigation or other new agricultural practices often intensifies the problem because weeds, as well as crops, respond favorably to improve growing conditions.

An arsenal of effective weed control practices has evolved over years in developed countries, but under unique circumstances. Small farmers of the developing world are largely unable to match these circumstances.

Hand weeding - The dearth of labor for hand weeding has forced developed countries' farmers to seek and utilize other methods. Developing country small farmers are still able to rely on family and hired labor, although hired labor for weeding is becoming scarce at certain periods in many regions.

Predictable weather - Most developed areas lie in temperate zones. This has a strong influence on all agricultural practices including weed control. Extremely wet or dry periods are very detrimental to the performance of many herbicides.

Cultural practices - Modern weed control is often based on carefully conducted cultural practices such as a well prepared seedbed and uniform planting depth. These activities require certain inputs, often beyond the grasp of developing country small farmers, therefore mitigating against advanced technology weed control.

Mixed cropping - Monocropping predominates in developed countries whereas mixed cropping is widely practiced in developing countries.

Hill farming - Mechanized agriculture is largely conducted on flat or rolling terrain. Many developing country small farmers have been forced off flat land and onto steep hills that preclude use of tractors, plows, cultivators, mechanized pesticide application, and even animal traction.

Educational level - The small farmer of the developing world is often unable to read or write. His ability to comprehend new technology is limited.

Commercial and public support - The developed world farmer has been assisted by readily available data and materials from reliable commercial firms such as farm implement dealers. Also, land-grant universities and agricultural extension services have been a constant source of information to farmers. Both resources tend to be far less available in LDCs.

These factors, coupled with poorly defined governmental programs and policies, help explain why proven weed control technology has not been directly transferable from developed to developing regions.

2. Weed Problems

All plant life requires moisture, nutrients, and sunlight for growth; undesirable plants (weeds) compete with desirable plants for these available elements. Weeds have to be limited or controlled, in most cases, to provide optimum growth conditions for the desired (crop) plants. Left uncontrolled, weeds have the potential to cause complete crop failure, although a common yield reduction falls in the range of 60-70%.

Most weed caused damage to crops occurs within the first 30 days of crop plant life, also usually a period of peak labor need. Often, land in production is limited by the amount of weeding that can be performed given the available labor supply. The effective constraint is not area of land available, but the weeding requirement of land in production and the availability of labor to perform the task of weeding.

It was found that on small farms over 50 percent of the total cost of corn production in Costa Rica and of corn and rice production in the Philippines was for weed control. Furthermore, most of the labor for weed control was supplied by the family. When this information is considered together with field research data showing that hand weeding is extending over such a long period that weeds are reducing yields, the need for better control systems is obvious. Improvement in labor efficiency for weed control can release some of the family help to grow additional crops as well as increasing yields.

Tillage of tropical soils has long been recognized as causing serious erosion and soil structure problems. No or minimum tillage systems are in wide use in some places in developed countries. Recent highly promising research at CATIE and on cooperating farmer land in Costa Rica and at IITA in Nigeria indicates such systems may be even more valuable in tropical climates. Compared with conventional tillage methods, no or minimum tillage has been shown to greatly decrease soil erosion and soil compaction and to increase available water and nutrients in the soil.

The use of effective herbicide applications to make no or minimum tillage possible, to decrease peak labor requirements for weeding, and to kill weeds that cannot be controlled by conventional hand methods appears practical for many small farmers in LDCs. In contrast to much of the technology in highly developed countries, herbicide use requires a minimum of capital and energy inputs. Backpack sprayers are widely used and quite satisfactory for small farmers. Proper selection of herbicides can keep capital costs and health and environmental hazards to a minimum. Glyphosate, the most promising herbicide for use in minimum tillage, is applied to the foliage, translocates to the roots and kills tropical grasses and other weeds. It is rapidly inactivated by the soil so crops can be planted safely within a few days and it has very low toxicity to all animals on which it has been tested.

Developing country weed problems can be viewed in three categories.

Field preparation - Removal of vegetation prior to planting on many LDC small farms poses a difficult, time consuming job. Observation indicates that this practice may require more effort than any other weed control operation. It also may limit the amount of land that can be planted by a farmer.

Crop weeds - While extremely diverse, crop weeds do have the common characteristic of being associated with the crop during the production cycle. Controlling these weeds is complicated by the presence of crop plants. Hand weeding and cultivation can be very effective between rows, but much more difficult in the crop row. Most herbicides available for this purpose are dependent on the aforementioned uniform cultural practices, relatively predictable weather, and farmers having at least basic knowledge of herbicide use principles.

Special weed problems - This category focuses on weed problems both beyond the control of normal local practices, and fairly widespread currently Leading examples include: *Imperata cylindrica*, common throughout S.E. Asia and West Africa; *Cyperus rotundus*, reported as a weed in 52 crops in 92 countries; and *Rottboellia exaltata* which is common in many tropical crops and difficult to control by either mechanical or chemical methods.

3. Weeds and Labor

Traditional weed control methods--hoeing, chopping, cultivating--impart high labor demands with potential to limit production expansion. Several studies have shown that manual weed control commonly absorbs 20-50 percent of total crop production labor within traditional agriculture. Modern weed control practices generate the opposite effect; as labor-saving innovations in developed agriculture, they can cause severe social dislocations. Weed control thus stands apart from other innovations--new varieties, irrigation, chemical fertilizers, and insecticides--which are labor-using, or neutral. The transition from hoe to herbicides (generally applied by backpack sprayer in developing countries) can reduce labor requirements 20-fold in short cycle crops, and up to 35-fold in long cycle crops.

From this apparent contradiction emerges the conclusion that selection of an agronomically sound, economically efficient, and socially acceptable weed control system requires a thorough understanding of the physical, economic, and social realities of the particular geographical region being considered.

Modern weed control techniques are labor-reducing per unit of land. But if absolute labor constraints exist during peak weed control periods and land is not limiting, their introduction permits acreage expansion, or cropping intensification, resulting in expanded labor utilization during other seasons on an entire farm basis. Similar rationale frequently has been used to justify introduction of herbicides into developing countries. This conclusion depends on the presence of a specific economic and ecological relationship characterized by relative scarcity of labor rather than land or the potential for more intensive farming once weeds are controlled.

Furthermore, to be economically valid, such conclusions must be based on the social opportunity costs of labor and capital, rather than usually distorted market prices. While the acreage expansion/cropping intensification argument often is valid for high-wage, labor-scarce developed agricultural economies, and for special settings in developing countries, its broad extension to the dominant labor-abundant agriculture pattern in the poor nations remains doubtful. In developing countries where labor surpluses present serious problems, economic analyses have concluded that the optimal solution rests with intermediate technology, or an improvement of traditional methods.

This, in fact, coincides with a major research thrust of this project which promises to be a major breakthrough. A dominant problem in developing countries involves preparing land for the crop. Crop residues, weed regrowth, and heavy labor demands constitute a frustrating bottleneck to adequate seedbed preparation, with consequent weed problems and poor yields. Tentative research results suggest that chemical seedbed preparation may be the most efficient method of preparing land, as well as a technique to greatly reduce weed control costs. Cost reductions when compared with traditional systems have ranged between 28-67 percent. Briefly this practice involves killing weed growth with a non-residual chemical, letting the weed growth lay on the surface as a weed inhibiting,

soil and water conserving mulch and direct seeding or transplanting the new crop into the mulch. Seedbed preparation in minimal as in U.S. no-till or minimum operations.

B. Current Project Background

In 1966 the Agency for International Development contracted with Oregon State University (OSU) to improve weed control research in selected developing countries, primarily focusing on Latin America. That contract, with extensions, terminated March 31, 1973. The International Plant Protection Center (IPPC) at OSU developed from this contract.

Project objectives were oriented toward developing institutional and staff weed control capabilities, within developing countries, that would contribute to increased agricultural production. The project was particularly successful in raising the level of weed control research, and subsequent production, in Colombia and Ecuador, countries in which the project maintained resident staff. On a worldwide basis, IPPC became recognized as a major center for international weed control information and technical support.

Increased food production obviously remained a major goal for developing countries, but, as the first wave of results from the introduction of modern agricultural technology--the "green revolution"--were analyzed, development scholars noted that not all segments of developing country citizenry enjoyed equal benefits from the change. Progressive. relatively affluent farmers tended to capture the bulk of the gains while the social and economic positions of small farmers and rural laborers deteriorated. Recognition that new technology was not neutral in its social and economic effects precipitated a redefinition of project goals.

A second contract incorporated new dimensions within two basic thrusts:

- to develop weed control systems for small- and medium-size farms in developing countries, encompassing traditional and modern techniques, or combinations;

- to evaluate the resulting systems in terms of effects on both economic and social conditions and goals, such as economic efficiency, unemployment, and income distribution, among others.

Activity under the contract (started April 1, 1973) suggested that a trade-off does exist between societal goals: maximization of a specific objective, such as economic efficiency of production, may not lead to concurrent maximization of other community goals.

Project generated information suggests that small farmers in Northeastern Brazil and El Salvador are likely to continue to rely on manual (traditional) weed control methods for traditional food crops, not only because these methods are economically efficient, but because both on- and off-farm alternative opportunities are extremely limited. But small

farmers in both regions also work as farm laborers for larger farms. Under present subsidized prices, weed control for cash crops grown primarily on plantations--sugar cane in Brazil and rice in El Salvador--is moving toward chemical methods. In Brazil, the switch will cause a 45-91 percent decline in labor employment. The distribution impact will be severe: up to 16 cruzeiros will be lost to agriculture workers for every cruzeiro gained by the plantation. Similar conditions were found in El Salvador, though not as extreme.

IPPC presently holds two contracts. Both began in April 1976. One, a technical assistance effort, aims to strengthen the science of terrestrial and aquatic (subcontract with the University of Florida) weed control through training, institutional building, and improvement of the flow, scope, and interchange of information among members of the world weed research community.

A research contract continues the effort to develop more effective weed control technologies and to evaluate their economic impacts. Since Brazil and El Salvador both had an abundance of cheap labor, countries with different factor endowments were selected for continued research. The Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE) headquartered at Turrialba, Costa Rica, plus AID's Regional Office for Central American Programs (ROCAP), and IPPC entered into an agreement to work cooperatively on small farm production problems in Central America. The coastal regions of Costa Rica provided abundant land; also, labor was becoming increasingly scarce, hence, more expensive.

In Asia, a second project site was established jointly with the Philippine National Crop Protection Center. This effort emphasized multiple cropping in upland production zones.

Results from both locations have been encouraging. Work in Costa Rica has been particularly satisfying. Project initiated efforts on chemical seedbed preparation could launch a major production breakthrough for small farmers. Some adoption by farmers has already started. The results of the work are reported in the annual project report and will be part of the final report of the contract.

C. Project Accomplishments

The U.S. Agency for International Development and Oregon State University have jointly conducted a concerted, 12-year effort to improve the level of weed control in less developed countries.

The program, coordinated through IPPC since 1969, has matured from a pure, production oriented research project, to a multiple objective, multi-disciplinary activity. The program's immediate past encompassed a broader scope and sensitivity to critical socio-economic dimensions. The important facet of aquatic weeds and the threat they pose was integrated into the companion project on weed technical services in 1976 through a sub-contract with the University of Florida.

The program has generated both tangible and intangible benefits for developing countries. There is no gauge that can effectively measure how many more small farmers altered their weed control practices to incorporate improved techniques. But a groundswell of interest in, and awareness of, weed control has occurred among farmers, agriculturists, and government policy makers, and in this the AID/IPPC project has played a significant hand. The many scientific and professional papers prepared by project personnel support the high degree of effectiveness of the project.

Presently IPPC receives a continuous stream of requests for information and project publications. In calendar 1977 the project distributed 4,498 copies of seven titles--mostly in response to requests--to 99 countries ranging from Argentina to Zambia. An additional 1,139 copies of reprints were distributed by the program in 1977, a 62 percent increase over the previous year.

The periodic newsletter, INFOLETTER, published by IPPC with project support, contains a news mix of strong interest to most of its nearly 4,000 recipients, judging by the increasing volume of requests for it. Recipients rarely ask to be removed from the mailing list. INFOLETTER has won several awards and is regarded as an important tool for developing country agriculture.

D. Project Linkages

IPPC works closely with several major international agricultural centers. A large number of project publications have been supplied to CIMMYT to support its wheat and maize training programs. There is an established interchange between IPPC weed specialists and the weed scientists at IRRI and IITA. IPPC and CIAT, with AID support, organized and conducted an intensive, month-long weed control short course at Cali in 1975 that has been cited as an exemplary training program. Numerous attendees from the course have maintained contact with IPPC.

The weed control data collection accumulated at IPPC has established the Center, and its project relationship, as an internationally recognized information clearinghouse. Too, IPPC possesses one of the most exhaustive listings of weed control workers worldwide. This resource materially assists the international community to maintain and establish contacts.

E. Prospects for the Future

Feedback received from project operational sites, AID formal evaluations, and response worldwide, persuasively argues that the AID-IPPC program has more than meeting its objectives. The effort has been instrumental in raising the weed control consciousness level in many, many countries. IPPC has become recognized worldwide as a clearinghouse for current information, professional contacts, and stimulation in a number of weed control related areas. Project professional staff are sought after for consultation and assistance and considered an unbiased source of useful information.

Work nearing completion under current contracts indicates considerable progress in developing appropriate weed control technologies for small farmers in developing countries and in assessing the social and economic benefits and costs associated with the new technologies. Additionally, a continuing program of technical assistance has been effectively conducted to improve research and program development and implementation. Capabilities of both aquatic and terrestrial weed scientists in developing countries, as well as the development of associated institutions, have been increased and sharpened. Further work on the chemical mulch, no-till system previously described, to adapt its practices to small farmer operations hold great promise for reducing per unit costs of production while allowing more efficient use of land and labor. Development of both the technology and equipment to implement the technology, i.e., improved herbicide applicators and hand planters suitable to small farmers, is being planned.

II. PROJECT PROPOSAL, GOAL AND PURPOSE

A. Proposal

Building on past experience and progress, it is proposed that the Agency for International Development and a selected contractor enter into a new research contract to continue to improve the capabilities of developing countries to effectively and efficiently cope with weed problems.

This proposal concerns only research; a companion proposal discusses technical assistance. Both are essential to adequately meet the needs of the weed control community and to provide basic data for weed control policy formulation and evaluation. Complementaries exist through joint management of the contracts. Contractor staff time and interests would be assigned and concerned with both proposals allowing for simultaneous and interchangeable use. Rejection of one proposal would create major obstacles for realizing objectives of the other.

B. Goal

To increase the quality and quantity of food crop production and the welfare of the small and medium size farmers of the cooperating LDCs by assistance in integrated weed control.

C. Purpose

1. Develop weed control systems for small and medium farms in selected developing countries to increase crop yields.

2. Evaluate the new weed control technology in terms of the social and economic goals in LDCs.

3. Improve weed research capabilities.

III. PROJECT OBJECTIVES AND BENEFITS

A. Objectives

1. Agronomic

a. Evaluate and adopt currently available as well as new and promising weed control technologies which are economically, socially, and environmentally compatible with resource, environmental, and personal endowments of small farmers in developing countries.

b. Improve, design, and test simple weed control equipment necessary for both weed control adoption and expediting weed control research.

2. Economic

a. Study the magnitude of the economic and social change required to introduce adopted technologies within and between regions and countries with different quality and quantity of productive inputs and governmental policies, and institutions.

b. Determine the magnitude of the economic and social change required for introduced weed control technologies to be adopted at the farm level under specific physical, biological, economic, social, and environmental conditions.

c. Evaluate the impacts of alternative weed control technology on the agricultural sector. Special emphasis will be placed on impacts effecting the well-being of small traditional farmers and their families, the associated nonlanded agricultural labor pool, and other related components of the agricultural community.

d. Develop benefit-cost procedures for the evaluation of aquatic weed control.

B. Benefits

1. Potential Benefits to Developing Countries

A presidential panel on world food supply noted in 1967 that, "the U.S. government considers aid for agricultural development an important arm of foreign policy." Agrarian cultures can benefit from increased agricultural production through lowered dependence on external food sources, less depletion of monetary reserves, and avoidance of food shortages and associated civil unrest. Past research, has identified and provided potential solutions to major weed control bottlenecks that restrict production. This promising work needs further refinement and testing, as a major breakthrough such as chemical mulch combined with minimum tillage, appear imminent.

However, increased agricultural production is not sufficient in itself to stimulate broad improvement of social welfare in developing countries. The benefits and costs of advanced technology tend to be distributed unevenly within the community. As new productive methods are adopted, certain population groups gain while others lose. Income levels, income distribution and employment are all affected.

Uninformed governmental decision makers, when faced with the need to promulgate edicts, may base their policies on supposition, rather than fact. The proposed program of research has the potential to provide information to assist governmental representatives in formulating policies bearing on weed control in a more rational, informed manner, policies that will foster improvements in the control of weeds and at the same time integrate potential social costs.

2. Potential to AID

previous pairing of research and technical assistance activities by the AID-supported program produced a synergistic result with both elements thriving and complementing one and other. The same opportunities exist in this new proposal.

Benefits also would derive from an experienced, knowledgeable staff, and an established infrastructure in place and ready to commence project operations with little start-up delays or costs.

a. Anticipated Benefits

Optimum benefits would be expected to result from a contractor having the following characteristics:

I. a functioning, experienced core staff;

II. an established and equipped project headquarters (eliminating the possibility of lost time due to start-up);

III. a project staff with extensive worldwide contacts in weed science and agricultural economics;

IV. continuing strong institutional support and extensive facilities;

V. interest and ability in foreign languages;

VI. familiarity with AID administrative and managerial operating policies and procedures;

VII. a backup staff geared to multiple functions.

IV. Project Analysis

A. Economic Feasibility

Data from the project description indicate the economic viability of research on weed control. Traditional hand weeding method result in an average loss of 25% of the crop. This loss can easily wipe out any planned margin of profit in an enterprise such as crop production known for its low margins of profit particularly in LDCs. Without traditional weeding practice losses range upward to total loss of crop. In addition to reducing losses from current planted acreages improved weed control technology allows the farmer greater latitude for more intensive cropping on the same land or frees labor for farming larger areas. With seasonal weed problems prohibiting cropping during certain periods and requiring 25 to 50% of available labor during cropped seasons improved weed control can greatly expand land and labor productivity. New research on chemical mulch and minimum or no tillage points the way the large saving in seedbed preparation costs. In field test these savings have ranged between 28 to 67%. Even considering the cost of applying improved weed control practices on the high side as equivalent to traditional hand weeding methods the increased production and savings on seedbed preparation provide a high return to the project.

B. Social Soundness Analysis

Applying appropriate technology to the weed problem at hand is the key to preventing socially unacceptable labor displacement. In areas where a excess of labor and fully exploited lands exist then hand weeding may be the most feasible even with a resulting 25% loss in crop. However, project data indicates that on small farm, i.e., our target population, that family labor provide most of the weeding labor force. Only in plantation operations hiring a large labor force does herbicide weed control cause major labor displacement. Family labor would be bettar employed in other activities such as crafts, education or more intensive agriculture. Weeding is a low paying, low productivity occupation. Most any other endeavor is more rewarding both aesthetically or monitarily.

This project in the past and in the future will look for the most appropriate technology to fit small farmer conditions. In many areas where weed control is the limiting factor to increased land cultivation and therefore increased crop production extensive use of herbicides is the solution to increase productivity and income.

The companion project to this activity, Weed Research Utilization, assists LDC agriculture staff in extending research information developed by this project.

Government and private farms are used as demonstration areas to improve technical adaptation and increase farmer adoption.

C. Technical Feasibility

Much of the basic technology is available from developed countries. Adaptation and the use of appropriate technology for small farmers and the environment in which they exist is the important contribution of this project.

Close coordination is required with agronomist, soils specialist and agricultural economist to properly blend appropriate weed control with multiple cropping needs, soils type and climate and the socio-economic conditions existing. High rainfall tropical environments provide growing condition much different than where most of the weed control technology was developed. Indigeneous weed species are more competitive with production crops and often resistant to temperate zone developed herbicides. Consequently new technology is being developed to meet these problems. The previously mentioned chemical mulch is a new adaptation that appears particularly suited to humid tropical environment. It requires a low level of technical adaptation, infrastructure, capital investment and equipment for adaption. The herbicide is non-residual and beneficial to the environment from the standpoint of providing a mulch that is moisture and soil conserving. The chemical has a low toxicity for other than plant growth and in combination with other weeding methods either manual or herbicidal gives full season weed control. There does not appear to be any major technical problem with the exception of a few weed species which require more study and the development of selective herbicides for their control.

D. Administrative Feasibility

The project has been administered in the past by a land grant university which overtime has developed both a domestic and international research staff to implement the project. They also have provided a referenc brary and newsletter of international reputation to disseminate researc information. The companion technical services project managed by the same institution is closely coordinated with the research activity and form a complete service for LDCs. To cover aquatic weed problems this institution has subcontracted with another university which specializes in this area. As can be seen the technical management of the project is very diverse and complicated. Much time, effort and investment has gone into the development of this capability and facility and it could not be readily or quickly duplicated. Unique skills and specialties are required that are not readily available. Rather they must be trained and developed over time through formal education and field experience. To accomplish this administration task OSU has organized the IPPC which also supports and cooperates closely with the International Weed Science Society (IWSS).

Host country administration is provided by CIAT in Costa Rica and the National Plant Protection Center in the Philippines. Both entities have proven most cooperative and supportive as concerns the project. In Asia particularly this was a long involved process to discover and involve interested and competent host country administrators. In Central America due to their past experience with the project activities and staff the transition from Brazil to Costa Rica was not such a difficult

process.

In summary the administrative functions of the project a extensive and complicated. It requires not only the intent and resources but experience expertise, reputation and international contacts to be able to provide the services on which AID and LDCs have come to depend.

E. Environmental Impact

Initial Environmental Examination - the activities of this project fall into the area described in Environmental procedure regulations, Para. 216.2. (c) "Analyses, Studies, Academic or Investigative Research, Workshops and Meetings". These classes of activities will not normally require the filing of an Environmental Impact Statement or the preparation of an Environmental Assessment. It is possible that an output of this project will be a set of procedures, guidelines or research results which when used would require such an assessment. However, the project itself only proposes research and directly supportive activities. Under these guidelines this activity clearly qualified for a negative determination at the time when a threshold decision is determined.

V. Financial Plan

This proposal requests AID funding to extend the project an additional three years to:

1. Perfect new technology which both controls severe tropical weed growth and provides a weed residue mulch that continues to suppress weed while providing a superior cultural medium.

2. Continue research on the most serious tropical weed problems for which only marginal control has so far been developed.

3. Develop improved herbicide application equipment.

4. Study socio-economic consequences of various weed control systems as pertains to small farmers and rural poor.

5. Continue the development of superior, environmentally sound, socially acceptable, weed control systems for small farmers.

As discussed in the Economic Feasibility section IVA the potential return on the proposed research far exceeds costs. Host country contributions of staff, land, facilities and equipment exceed 25% of the cost of the project activity in their respective countries.

Following is a statement of annual costs and FY obligations:

Year	Required Amounts	Obligations FY (000)
April 1, 1979-Mar. 31, 1980	$306,315	FY 79-325
April 1, 1980-Mar. 31, 1981	310,527	FY 80-200
April 1, 1981-Mar. 31, 1982	361,759	FY 81-454
3 Year Total	$978,601	979

A detailed budget is provided in Annex A.

VI. Implementation Plan

A. Geographic Areas

Two geographic areas have been identified as productive sites for in-field staff: Costa Rica and the Philippines, with outreach to neighboring nations.

1. Costa Rica - Results from the existing research contract, coupled with the established CATIE (Centro Agronomico Tropical de Investigacion y Ensenanza) research effort, support the continued location in Turrialba. CATIE, through an AID contract, is attempting to develop appropriate farm systems for small farmers in Central America. The project has formed an integral and important part of this effort, so much so that presently a project staff member is serving as Associate Director for Training and International Relations for CATIE. Relations with CATIE are excellent and relationship continues to be jointly successful.

2. Philippines - The project input is anticipated to complement ongoing programs at the Los Banos based National Crop Protection Center (NCPC). NCPC, through its regional bureaus, is embarking on a nationwide effort to meet the research, training, and extension pest control needs of small farmers in the Philippines. Weeds constitute one of the major problems. It is envisioned that NCPC will expand its activities to include parts of South-East Asia as its capabilities increase.

B. Personnel

Proposed staffing for the project envisions:

Three professionals in the field;
Four professionals (not full time) at contractor headquarters
Five support staff

1. In-field

Weed Control Specialist (1.0 FTE) - stationed at CATIE, Turrialba, Costa Rica, working with CATIE, ROCAP (Regional Office of Central American Programs), the Costa Rican Ministry of Agriculture, as well as MOA personnel in El Salvador, Guatemala, Nicaragua, Honduras, and Panama. Would also collaborate with various university staffs.

Economist (1.0 FTE) - stationed at CATIE, Turrialba, Costa Rica, working with CATIE, ROCAP and governmental personnel of the Central American region. The duty station could periodically change if required to meet needs of the project.

Weed Control Specialist (1.0 FTE) - stationed at Los Banos, the Philippines, working through NCPC, regional crop protection centers, the Bureau of Plant Industry, and other entities.

2. Contract Headquarters

Project Leader (.2 FTE) - primarily administers program and coordinates both human and material inputs through the contractor Departments

of Crop Science, and Agricultural and Resource Economics; also provides general staff and budget management and carries responsibility for contact with AID, plus national and international research organizations. The project leader will be expected to visit project staff in the field at least once, and probably twice, a year.

Weed Control Specialist (.2 FTE) - helps the project leader provide direct in-field project management and maintain liaison with other agencies. The specialist directs the program of handling and responding to inquiries for technical information, provides literature, material, and technical back-up support for the field staff, and serves as a consultant and short course principal. Participates in research activities of the Consortium for International Crop Protection. Supervises and conducts research activities at headquarters. These include equipment development, herbicide screening trials, and specialized weed control research.

Information Specialist (.2 FTE) - has dual responsibility for all aspects of the publications/information program plus administrative duties including acting as project director during the director's absence. Carries out and supervises all functions associated with preparing, publishing, and distributing publications.

Economist (.33 FTE) - leads, coordinates, and supervises all activities of field economist and two economics graduate students. Responsible for all socio-economic aspects of the project.

3. Support Staff

Technician (1.0 FTE) - assists the weed control specialist in conducting research programs, performs studies and evaluations of equipment, fulfills field staff equipment needs.

Bookkeeper (.2 FTE) - responsible for fiscal affairs including maintenance of accounts, records, ordering, billing, travel, and budget preparation under guidance of the director.

Secretary (.2 FTE) - normal range of clerical activities including typing staff correspondence, reports, and other documents, plus filing, reception, and other support.

Graduate student (Econ.)(.5 FTE) - conduct socio-economic evaluation of the project activities in the Philippines. Works under supervision of the senior economist and is based at headquarters. It is envisioned that the student will be an advanced Ph.D. candidate.

C. Project Methods

In order to realize project objectives, the following methods and procedures will be followed.

Acceptable agronomic and economic research practice dictates that problems need to be thoroughly defined before potential solutions can be sought. Once the basic problem has been specified and a promising solution identified, available resources should be directed toward testing the procedure, modifying it if necessary, and introducing the technique. This process led to current program activities in Costa Rica; the chemical mulch technique holds sufficient promise to receive most of the available research effort in Costa Rica. No single approach has been identified in the Philippines as yet, so a wider range of potential solutions is being investigated.

1. Agronomic

a. Modify currently available weed control technologies and procedures through adaptive research to ensure biological, social, ecological, and financial acceptability to small farmers.

A general goal of an agronomic researcher should be to utilize existing techniques as much as possible, particularly for small farm applications in LDCs. This is one of the reasons travel to other areas is so useful. Certainly these techniques need to be modified, but no one has a monopoly on good ideas. The currently available technologies to which reference is made may be a herbicide used in a conventional manner, or a cultural practice such as flooding or mulching. The project's function is to be aware of these potential solutions and be able to effectively match them to existing problems.

There is no foolproof formula for this activity. It is difficult and time consuming work. Under controlled conditions in the U. S., three to five years normally are required to introduce a new technique. A series of experiments over time and space is required to solve field problems under such diverse conditions.

b. Continue evaluation and modification of chemical mulch seedbed preparation techniques as a method for weed and erosion control.

The use of herbicides to kill existing vegetation and form a thick mulch on the soil surface appears promising in the Atlantic zone of Costa Rica. Before the technique can be recommended even in that zone, the project needs to determine possible shifts in weed population, interactions with other pests, and certainly the effect on soil nutrients and interactions with commercial fertilizer. This can be accomplished by conducting a series of field experiments testing for the above variables.

Example: Project personnel have observed that controlling the lush annual and perennial grasses encourages growth of certain broadleaf species. Fortunately, they appear to be easier to control than the grasses.

Most of the small farmers in the region rely on decaying weeds as a source of plant nutrients. If a method kills the weeds or otherwise discourages the heavy weed population now being allowed to grow before planting, how will this affect plant nutrient availability? What is the role of commercial fertilizers under these conditions?

The Atlantic zone has a particular set of environmental conditions largely dictated by high rainfall; other parts of Costa Rica and Central America differ. The mulching technique needs to be tested (and modified if necessary) under other conditions and different crops if it is to have more than a very limited impact. Field experiments by, or under, the guidance of project staff are necessary to provide this information.

c. Develop and evaluate new weed control application techniques. For example, work will continue on coating seeds with herbicide which, at germination, results in a band of weed control directly around the emerging seedling.

If existing techniques or modified versions cannot solve certain problems, new approaches must be sought and developed. Although not a common technique, the technique of adding herbicides to a lime coating on seeds illustrates the point. This is new and is still in the testing phase. Project personnel, on first hearing of the work, recognized its potential as a tool for a long standing weed problem in beans in less developed countries. The key researcher, Dr. Jean Dawson, was invited to test the system in conjunction with the project's Central America program. However, initial results were not as encouraging as results in the U.S. Follow-up research is being considered. A granule formulation of the same herbicide (EPTC) has yielded encouraging results and may be easier to introduce since it is in commercial use in the U.S.

d. Develop control procedures for weeds or situations where traditional systems are inadequate or nonexisting. Weeds of special concern will be: Imperata cylindrica, common throughout S.E. Asia and West Africa; Cyperus rotundus, reported as a source of considerable loss on 52 crops in 92 countries; and Rottboellia exaltata, a common weed in many tropical crops.

Rottboellia exaltata is a rapidly spreading weed in many tropical areas. It has small, sharp, irritating spines which make it unpleasant to hand-weed. It can germinate throughout the year, so mechanical weeding must be performed often. Only one selective herbicide is available to control Rottboellia exaltata in corn and it is marginal both in effectiveness and safety to the crop. Various new systems are needed to help control this weed.

The weeds named here, and certain other problem weeds, can be effectively controlled with the herbicide glyphosate, an expensive and nonselective compound with no soil life. The problem is to adapt these characteristics to production practices for specific crops. Time and extensive field experiments are needed to accomplish the task.

Most special problem weeds are perennials. Rottboellia exaltata is an exception. It is an annual that can germinate at any time during the crop cycle, thereby eliminating glyphosate. Extensive effort in the Philippines is being directed toward control of this weed. At the present no simple solution is available. Systems of modified chemical seedbed, delayed seeding, mechanical control, and selective herbicides are being tested. Only continued field testing will solve the problem which is so widespread that a useable solution will provide a significant contribution.

e. Promote promising weed control technologies through demonstration plots, on-the-job training, seminars, workshops, and conferences.

Whenever a successful technique is identified it must be tested under a wide range of conditions. This is most efficiently accomplished by introducing the system to counterpart researchers and key farmers so that staff efforts can be significantly multiplied.

f. Publish research results in scientific, professional, and technical publications.

g. Develop small equipment to implement adoption of improved weed control techniques. Jab planters to penetrate mulch and simultaneously plant seed and apply fertilizer would be one example.

Two different planters have been obtained to test under mulch conditions. Myron Shenk also has had a prototype jab planter built for field testing. Further activities will depend on results of these tests.

h. Design and develop specialized equipment for weed control research. Previous project efforts developed a plot squaring device and a specialized hand-held sprayer boom.

Research equipment efforts will center on modification of the knapsack sprayer to allow effective field research. The bulk of this work will concern improved and multiple-nozzle spray booms.

2. Economic

a. Identify most promising weed control technologies by: (1) those which are deemed technically superior in weed trials, (2) those which appear to be economically comparable, or superior, to existing farmer technologies through comparison with actual farm survey information.

(1) Evaluate probable effects on yield, resource substitution, and relaxation of seasonal labor constraint at the farm level by use of budget analysis techniques which permit evaluation of new technologies as resource substitutes prior to any actual farmer adoption.

(2) Quantify relation between weed control and other production inputs such as spacing, fertilizer, and seedbed preparation using analysis to guide field plot experimentation on a farmer demonstration basis.

(3) Monitor the change in small farmer production technologies and economic structure as adoption proceeds through farmer demonstration trials to determine actual farmer gains in terms of yield and reduced cost from resource substitution and farmer modification to better suit his unique conditions.

b. Survey small farms in regions other than those where field experiments are conducted to identify objectives, existing production techniques, and resource endowments to determine potential transfer ability of improved weed technologies from the North Atlantic zone to other regions in Costa Rica.

c. Develop farm, regional, and national models to quantify economic and social effects of introduced technologies under a variety of conditions.

(1) Utilize experience in Brazil, El Salvador, Costa Rica, and the Philippines to quantify the economic conditions or levels of economic gain necessary to realize actual adoption of introduced weed control technologies.

(2) Utilize existing economic models to evaluate social and economic consequences of introduced weed technologies as they impact on the small farmer and associated labor pool under the wide variety of conditions found in Brazil, El Salvador, Costa Rica, and the Philippines.

(3) Compare magnitude of economic efficiency gains of technology against any societal losses including employment and income redistribution which might result from weed technology adoption by small farmers.

(4) Quantify the effects which different relative resource endowments, institutional forces, and governmental policies have upon the rate of technology adoption and resulting income gain distribution to the agricultural and marketing sectors and consuming public.

d. Develop a framework for determining what component to include in a benefit cost framework for evaluating aquatic weed control. The nature of direct effects on small farmers as well as indirect effects upon the entire rural and associated community, including both market and nonmarket effects, will be included in the framework and compared with results from research with terrestial weed control.

(1) Assess existing aquatic weed control technologies in at least one location utilizing the benefit cost framework developed.

3. Timeframe

Scheduling research of the proposed nature is often unrealistic due to the unknown factors affecting a breakthrough in problem solutions. Also much of the activity is ongoing and continuing. Prior contractor progress has been highly satisfactory as determined by AID reviews, graduate countries continued progress, the expansion of knowledge and publications and the increased number of trained staff and country weed control programs. Consequently no timeframe is provided on individual activities. Regular and team reviews will determine if satisfactory progress is being made.

VII. Evaluation Plan

A. Related to Objectives

Evaluation could be based on the following points.

1. Development of appropriate weed control technologies for small farms in Central America and Southeast Asia.

2. The number of adoptions of the proposed technologies.

3. The number of weed scientists that receive on-the-job training.

4. Recognition on the part of government policy makers of the effects of government policy on weed control adoption and its related effect on the rural community.

5. Develop benefit-cost evaluation for aquatic weeds.

6. The number and quality of scientific, professional, and general audience papers.

B. Intangible Evaluation

Overall quantification of project effect in developing countries--greater practice of more effective or efficient weed control resulting in higher production, with attendant socio-economic conditions acceptable to the government--borders on the impossible in the short range. No single measurement device seems appropriate for systematically

assessing improvement.

Broad evaluation, therefore, necessarily reverts to: periodic reviews; the attitude or actions of those developing countries' citizens who have had contact with project activities; and other forms of feedback. Experience indicates that host government interest provides a clue to project worth.

Periodic reviews by AID personnel and others provide useful and welcome opinions of project activity, as well as highlighting and defining areas in which project operations can be modified and strengthened.

C. Evaluation Schedule

1. Annual review by project manager.

2. Team review following 18 months of activity.

3. Terminal team review to assess progress and determine future activity in the weed control field.

BUDGET. Three Year: April 1, 1979 - March 31, 1982

First Year: 4-1-79 through 3-31-80.

	FTE*	Man Months	Budget	Est. Cost
Salaries				
U. S. based staff:				
Project leader	.20	2.4	$6,272	
Research agronomist	.20	2.4	4,964	
Information specialist	.20	2.4	4,559	
Agric. economist	.33	4.0	9,372	
	(.98)	(11.2)	(25,167)	
Grad Research Assistant (Econ.)	.50	6.0	5,496	
Grad Research Assistant (Econ.)	.50	6.0	5,496	
	(1.00)	(12.0)	(10,992)	
U. S. based support staff:				
Fiscal Affairs/Translator	.20	2.4	3,107	
Secretary	.20	2.4	1,792	
Secretary (Econ.)	.33	4.0	2,956	
Research technician	.20	2.4	3,092	
	(.93)	(11.2)	(10,947)	
On campus subtotal				$47,106
Field Staff:				
Research agronomist, Central America	1.0	12.0	24,148	
Research agronomist, Philippines	1.0	12.0	26,000	
Economist, Central America	1.0	12.0	26,000	
	(3.0)	(36.0)	(76,148)	
Total U. S. Salaries				$123,254

* FTE - Full time equivalent

	Budget	Est. cost
Fringe Benefits (payroll costs)		
Factor X salaries + post differential 18% X $123,254 + $10,122		$24,008
Overhead (indirect costs)		
On campus: 34% X $84,281	$28,655	
Field: 21.2% X $148,045	31,385	
Total overhead		$60,040
Travel and Transportation		
U.S. travel (personnel and dependents)		
Travel of agronomist	701	
Travel of economist	701	
	1,402	
International travel (personnel and dependents)		
Agronomist to Philippines	5,024	
Economist to Costa Rica	3,336	
	8,360	
Other personnel travel		
Two trips to Washington by director	1,640	
One trip to Costa Rica by director	1,153	
One trip to Costa Rica by research agronomist	1,153	
One trip to Philippines by director	1,586	
One trip to Philppines by research agronomist	1,586	
In-country travel by staff	4,000	
	11,118	
Travel subtotal		$20,880
Transportation of household goods, baggage and vehicles		
One family to the Philippines	9,321	
One family to Costa Rica	8,213	
Transportation of goods subtotal		$17,534
Storage of household effects and vehicles		
Storage for two families in Costa Rica	1,200	
Storage for one family in Philippines	600	
Storage subtotal		$1,800
Total travel and transportation		$40,214

	Budget	Est. cost
Allowances		
Post differential		
Agronomist, Costa Rica (15%)	3,622	
Economist, Costa Rica (15%)	3,900	
Agronomist, Philippines (10%)	2,600	
Post differential subtotal	$10,122	
Quarters		
Agronomist, Costa Rica	2,880	
Economist, Costa Rica	2,880	
Agronomist, Philippines	5,520	
Quarters subtotal	$11,230	
Temporary lodging		
Agronomist, Philippines	1,440	
Economist, Costa Rica	630	
Temporary lodging subtotal	$2,070	
Education		
Agronomist, Costa Rica	600	
Economist, Costa Rica	300	
Agronomist, Philippines	3,300	
Education subtotal	$4,200	
Total allowances		$27,672
Other Direct Costs (VII)		
Communications	500	
Computer cost	2,000	
Medical examinations	830	
Vehicle insurance	600	
Defense base act insurance	7,249	
Total other direct costs		$11,179
Equipment, Vehicles, Materials and Supplies (VIII)		
Equipment (title retained in AID)		
Two replacement compressors (for research trucks)	300	
One C-P knapsack sprayer	100	
One 35mm camera, with case	450	
Two planters	200	
Two microtractors, one in each location	4,000	
Equipment subtotal	$5,050	

	Budget	Est. cost
Materials and Supplies		
Sprayer parts and nozzles	200	
Postage and office supplies	2,000	
Publications	500	
Seed, herbicides, fertilizers	2,000	
Auto supplies and tires	300	
Materials and supplies subtotal	$5,000	
Vehicles		
One carry-all (Costa Rica)	8,898	
Freight		
Ship vehicle, other freight charges	1,000	
Total equipment, vehicles, materials and supplies		$19,948
Total budget for 1979-80		$306,315

Second Year: 4-1-80 through 3-31-81

	FTE*	Man months	Budget	Est. cost
Salaries				
U.S. based staff				
Project leader	.20	2.4	$6,900	
Research agronomist	.20	2.4	5,460	
Information specialist	.20	2.4	5,015	
Agric. economist	.33	4.0	10,309	
	(.93)	(11.2)	(27,684)	
Grad. Research Asst. (Econ.)	.50	6.0	6,046	
Grad. Research Asst. (Econ.)	.50	6.0	6,046	
	(1.00)	(12.0)	(12,092)	
U.S. based support staff				
Fiscal Affairs/Translator	.20	2.4	3,418	
Secretary	.20	2.4	1,971	
Secretary (Econ.)	.33	4.0	3,252	
Research technician	.20	2.4	3,401	
	(.93)	(11.2)	(12,042)	
(On campus subtotal)				$51,818
Field staff				
Research agronomist, Central America	1.0	12.0	26,563	
Research agronomist, Philippines	1.0	12.0	28,600	
Economist, Central America	1.0	12.0	28,600	
	(3.0)	(36.0)	(83,763)	
Total U.S. salaries				$135,581

* FTE: full time equivalent

	Budget	Est. cost
Fringe Benefits (payroll costs)		
Factor X salaries + post differential . 18% X $135,581 + 11,088		$26,400
Overhead (indirect costs)		
On campus: 34% X $89,258	$30,348	
Field: 21.2% X $157,120	33,309	
Total overhead		63,657
Travel and Transportation		
International travel (personnel and dependents)		
Home leave for three families	23,392	
Other personnel travel		
Two trips to Washington by director	1,804	
One trip to Philippines by director	1,744	
One trip to Philippines by research agronomist	1,744	
One trip to Costa Rica by director	1,268	
One trip to Costa Rica by research agronomist	1,268	
In-country travel by field staff	4,400	
	12,228	
Travel subtotal	$35,620	
Storage of household effects and vehicles	1,980	
Total travel and transportation		$37,600
Allowances		
Post differential		
Economist, Costa Rica (15%)	4,290	
Agronomist, Costa Rica (15%)	3,984	
Agronomist, Philippines (10%)	2,860	
Post differential subtotal	$11,134	

	Budget	Est. cost
Quarters		
Economist, Costa Rica	3,168	
Agronomist, Costa Rica	3,168	
Agronomist, Philippines	6,072	
Quarters subtotal	$12,408	
5.2.5.4 Education		
Economist, Costa Rica	330	
Agronomist, Costa Rica	660	
Agronomist, Philippines	3,630	
Education subtotal	$4,620	
Total allowances		$28,162
Other Direct Costs		
Communications	550	
Computer services	2,200	
Medical examinations	913	
Vehicle insurance	660	
Defense base act insurance	8,304	
Total other direct costs		$12,627
Equipment, Vehicles, Materials and Supplies		
Equipment (title retained in AID)		
Replacement of calculators and sprayers	500	
Materials and Supplies		
Sprayer parts and nozzles	220	
Postage, office supplies	2,200	
Publications	550	
Seed, herbicides, insecticides, fertilizer	2,200	
Auto supplies, tires	330	
Materials and supplies subtotal	$5,500	

	Budget	Est. cost
[redacted] Freight	500	
Total equipment, vehicles, materials and supplies		$ 6,500
[redacted]		
Total budget for 1980-81		$310,527

Third Year: 4-1-81 through 3-31-82

	FTE**	Man months	Budget	Est. cost
Salaries				
U.S. based staff				
Project leader	.20	2.4	$7,590	
Research agronomist	.20	2.4	6,006	
Information specialist	.20	2.4	5,516	
Agric. economist	.33	4.0	11,340	
	(.93)	(11.2)	(30,452)	
Grad. Research Assistant (Econ.)	.50	6.0	6,650	
Grad. Research Assistant (Econ.)	.50	6.0	6,650	
	(1.00)	(12.0)	(13,300)	
U.S. based support staff				
Fiscal Affairs/Translator	.20	2.4	3,760	
Secretary	.20	2.4	2,168	
Secretary (Econ.)	.33	4.0	3,577	
Research Technician	.20	2.4	3,741	
	(.93)	(11.2)	(13,246)	
(On campus subtotal)				$56,998
Field staff				
Research agronomist, Central America	1.0	12.0	29,219	
Research agronomist, Philippines	1.0	12.0	31,460	
Economist, Central America	1.0	12.0	31,460	
	(3.0)	(36.0)	(92,139)	
Total U.S. salaries				$149,137

** FTE: full time equivalent

	Budget	Est. cost
Fringe Benefits (payroll costs)		
Factor X salaries + post differential 18% X $149,137 + $12,197		$29,040
Overhead (indirect costs)		
On campus: 34% X $105,739	35,951	
Field: 21.2% X $181,327	38,441	
Total overhead		74,392
Travel and Transportation		
International travel (personnel and dependents)		
Return 3 families to the United States	12,866	
Other personnel travel		
Two trips to Washington by director	1,984	
One trip to Philippines by director	1,919	
One trip to Philippines by research agronomist	1,919	
One trip to Costa Rica by director	1,395	
One trip to Costa Rica by research agronomist	1,395	
In-country travel by field staff	4,840	
	13,452	
Travel subtotal	$26,318	
Transportation of household goods, baggage and vehicles		
Return 3 families to the U.S.	28,321	
Storage of household effects and vehicles		
Storage of household effects and vehicles	2,178	
Total travel and transportation		56,817
Allowances		
Post differential		
Economist, Costa Rica (15%)	4,719	
Agronomist, Costa Rica (15%)	4,332	
Agronomist, Philippines (10%)	3,146	
Post differential subtotal	$12,197	

	Budget	Est. cost
Quarters		
Economist, Costa Rica	3,484	
Agronomist, Costa Rica	3,484	
Agronomist, Philippines	6,679	
Quarters subtotal	$13,647	
Temporary lodging	1,000	
Education		
Economist, Costa Rica	363	
Agronomist, Costa Rica (4 children)	726	
Agronomist, Philippines	3,993	
Education subtotal	$5,082	
Total allowances		$31,926
Other Direct Costs		
Communications	605	
Computer services	2,420	
Medical examinations	1,000	
Vehicle insurance	726	
Defense base act insurance	8,846	
Total other direct costs		$13,597
Equipment, Vehicles, Materials and Supplies		
Equipment (title retained in AID)		
Research sprayers	300	
Material and Supplies		
Sprayer parts and nozzles	242	
Postage and office supplies	2,420	
Publications	605	
Seed, herbicides, insecticides, fertilier	2,420	
Auto supplies and tires	363	
Materials and supplies subtotal	$6,050	
Freight	500	
Total equipment, vehicles, materials and supplies		$6,850
Total budget 1981-82		$361,759

Total budget 1981-82 ———— $361,759

3 YEAR BUDGET SUMMARY

	1st Year	2nd Year	3rd Year	Total
Salaries	$123,254	135,581	149,137	407,972
Fringe Benefits	24,008	26,400	29,040	79,448
Overhead	60,040	63,657	74,392	198,089
Travel & Transportation	40,214	37,600	56,817	134,631
Allowances	27,672	28,162	31,926	87,760
Other Direct Costs	11,179	12,627	13,597	37,403
Equipment & Supplies	19,948	6,500	6,850	33,298
Total	$306,315	310,527	361,759	978,601

931-17-130-463

4

PROJECT PAPER (PP)

for

WEED CONTROL SYSTEMS UTILIZATION FOR REPRESENTATIVE FARMS IN DEVELOPING COUNTRIES - - GTS COMPONENT

1. Contribution of, and need for, these services:

The goal of this contract is to increase food production on small and medium sized farms in the LDCs by decreasing the loss of production caused by weed infestations. This goal will be achieved by (1) increasing the number of trained weed control specialists by the use of on-the-job training, workshops, and dissemination of subject publications, (2) supplying response to country integrated weed control problems, (3) making available various weed information publications to all LDCs, and (4) developing integrated weed control systems.

Since 1966 Oregon State University has been the contractor with AID to carry out a weed control program - weighted toward research. Recently the contract focused on developing and evaluating weed control systems for representative farms in developing countries, with emphasis on small and medium-size farms. Research has been concentrated in El Salvador, Central America and Brazil. Contractor has conducted a small GTS program through utilization of publications, fielding survey teams and conducting workshops.

Contractor has developed institutional and staff weed control capabilities in LDCs which contributed to increased agricultural production. OSU has developed weed control systems for small and medium-size farms in LDCs which

encompassed traditional and modern techniques, or combinations. Also they have evaluated the resulting systems in terms of effects on both economic and social conditions and goals, such as economic efficiency, unemployment and income distribution.

In order for LDCs to raise production levels, new technologies and methods in weed control are required. To be useful, new technology must be socially acceptable to all levels of the rural community, including the small and medium-size farms. Therefore, this project will continue to concentrate on the need to: (a) encourage and help develop institutions responsible for weed control, (b) identify and train weed control specialists, (c) stimulate information flow and communications in the weed science community, (d) further develop weed control systems for small and medium farms, and (e) assess the economic and social impact of new weed control technology.

2. Services to Date:

Under the existing contract, during the last three years, the man/months each year devoted to GTS activities have been approximately:

Home Office Professional	32
Home Office Nonprofessional	25
Field Staff Professional	24

Services provided have been and shall continue to be:

-- Training weed scientists.

-- Improve the flow, scope and interchange of weed control information.

-- Encourage the utilization of integrated weed control programs.

-- Promote awareness of weed related damage to crop production.

-- Organize and conduct weed control short courses.

-- Provide short term technical expertise to LDCs.

-- Promote safety in the utilization of herbicides.

-- Publish a newsletter on weed science information.

-- Promote the establishment of weed science societies.

-- Edit multilingual weed science bulletins and publications.

-- Develop training programs for LDC weed institutions.

-- Conduct in-the-field weed control demonstrations.

-- Hold field days and tours of weed research activities.

Evaluation can be based on the proposed end of contract goals of this activity, the number of trained weed control scientists, the planned workshops, the request and response to country weed problems, and the level of information dissemination.

Quantification of project effect in developing countries - greater practice of more effective or efficient weed control resulting in higher production, with attendant socioeconomic conditions acceptable to the government - borders on the impossible in the short range. No single measurement device seems appropriate for systematically assessing improvement.

Evaluation, therefore, necessarily reverts to periodic reviews, the attitude or actions of those developing countries' citizens who have had contact with project activities, and other forms of feedback. In the latter category acknowledgments and thank you letters for publications received and a continuing flow of incoming publications requests point toward the desirability of continuing to disseminate weed control research information.

Experience indicates that host government interest is another clue to project worth. Periodic reviews by AID personnel and by others provide useful opinions of project activity, as well as surfacing areas in which operations can be modified and strengthened.

3. Evaluation of Services:

GTS services provided by the contractor have been excellent. Impact of the project can be measured by the successful efforts to train counterparts in proper methodology for weed control activities; by the promotion of practical and safe usage of herbicides through training programs; by encouraging consideration of regulatory laws and the ecological and environmental aspects of the programs; and through the continued development of a worldwide communications network for weed control specialists. The success of this project has depended, and will depend, on the provision of information to growers and farmers. This has been done effectively through in-country training programs, seminars, field days and demonstration plots. Other project utilization activities were: Information dissemination, publications, economic analyses and linkages with other weed research institutions. Contractor has prepared publications such as Prevalent Weeds of Central America, Weed Science Research Field Manual, Tropical Weeds, Aquatic Weeds and Manual of Pesticide Application Equipment. As further evaluation of the services of the contractor the following is quoted from page nine of the April 1975 Project Appraisal Report:

"The opinion of the technicians who reviewed the project is that they are following work plans, are on schedule with their research activities, have developed useful information, have trained counterparts, have undertaken outreach activities in neighboring LDCs, have developed excellent plans for future activities, recognize the socioeconomic impacts and, overall, have performed in an outstanding manner."

4. Expected Trend:

The expected trend can be determined by study of the project purpose which is: assist the world weed control community by training weed scientists, improving the interchange of information and by identifying the magnitude of important aquatic weed problems and developing integrated systems for their control.

Geographic trends include: phase out of program in Brazil, Central America remains an area of considerable concern for continued concentration, development of a National Weed Science Research Institute in Thailand and increased training and institution building on a worldwide basis.

Discussion with Regional Bureaus and requests from LDCs have combined to add aquatic weeds to the project goals. Through a subcontract with the University of Florida, short term consultants will be made available in all areas of aquatic weed activities. In total, 12 man/months will be available each year for this service. The initial effort will be to study each geographic area of the world to survey the aquatic weed problems. Planned are two aquatic weed regional conferences (Africa and Asia) as part of the OSU/Florida joint effort.

Objectives of the aquatic weed control program are:

To identify the viological and socioeconomic problems of aquatic weeds in agricultural and nonagricultural production.

To provide short term consultation in integrated weed control methods to the LDCs.

To establish answering services for aquatic weed problems.

To develop integrated control systems for economically important aquatic weeds.

5. Alternate Sources:

There are no alternate sources for AID to turn to in order to obtain the desired expertise, at least none with the expertise of Oregon State University and the University of Florida.

In addition to OSU's long time interest and capability in the weed control area the institution now has almost 10 years of experience in the foreign area as a result of the AID contract. During this period the institution has developed innovative research techniques, has gained experience in dealing with LDCs, has established a viable International Plant Protection Center on campus, and has acquired a trained professional and nonprofessional staff equipped to conduct the activities called for in this project.

The University of Florida has emerged as the leading institution in the United States in the area of aquatic weed control. The institution has long

experience in the aquatic weed field - in both research and utilization. It has a sizeable trained staff and experts recognized worldwide.

Oregon State University, through the years of its AID contract activities, has demonstrated that it is cost conscious - it is the opinion of TA/AGR that no other contractor, with proven merit, could be obtained to carry out this project within present budget estimates. It is also TA/AGR opinion that the subcontract with the University of Florida ($84,066 per year) is reasonable.

6. Other Issues:

Staffing includes four professional in the field, and five professionals and four support staff at OSU. The subcontract calls for 12 man/months of consulting service and one support position at the University of Florida. Facilities present at OSU and accessible to the project include all the facets of a major, agriculturally oriented land grant university, extensive research plots, laboratories, equipment, libraries, office space, material and equipment storage, electronic data processing equipment and the Office of the International Plant Protection Center.

Expertise in a wide range of disciplines, and years of experience, can be tapped for guidance in conducting project activities. The current project staff offers a considerable resource in that it represents an aggregate of 41 man/years of experience in international agricultural research and related activities.

(a) Role of Small Farmers and the Rural Poor

Basic goal of this project, since 1972, has been to develop integrated weed control systems for small and medium size farms in the LDCs. In addition, an attempt is being made to analyze small farm operations in order to establish efficiency trade-offs to achieve societal goals.

(b) Role of Women:

Women have traditionally been involved in weed control activities in the LDCs - not only as laborers but also as potential benefactors resulting from increased production. A major goal of this project is to survey the farm population and the associated agricultural labor pool (including women). The survey will provide coefficients for production, labor availability, consumption and human health for the socioeconomic models.

In those areas where mechanized or chemical control appear efficient and economical as a supplement to manual control, on farm labor performed by women will be reduced.

(c) Impact on Environment:

Herbicides will be recommended only when theur economic use has been proven to be superior to other methods. To assure a minimum of danger to the applicator and to the environment, training of applicators in the safe use of herbicides will be a continuing activity. The impact of this project should be positive since

it analyzes all methods of weed control and then recommends systems which demonstrate superior efficiency in contrast to recommending only pesticides.

(d) Effect on Purchased Energy Inputs:

The effect of the project on purchased energy inputs is unknown at this time and difficult to estimate with any degree of accuracy. However, the impact should be minimal when considering that efficient use of hand labor and hand hoeing of weeds is included as an area of study in the research project and, therefore, becomes one of the recommendations in an integrated weed control program.

THREE-YEAR BUDGET: TECHNICAL ASSISTANCE (GTS) COMPONENT

Category	1976-77	1977-78	1978-79	Total
Salaries and Wages				
On-campus	73,860	81,246	89,371	244,477
Off-campus	46,487	51,136	56,249	153,872
Total	120,347	132,382	145,620	398,349
Consultants	0	0	0	0
Fringe Benefits	18,640	20,504	22,554	61,698
Overhead (Indirect Costs)				
On-campus	33,400	36,740	40,414	110,554
Off-campus	15,392	16,931	18,624	50,947
Total	48,792	53,671	59,038	161,501
Travel, Transportation, and allowances	48,981	53,879	59,267	162,127
Other Direct Costs	2,839	3,123	3,435	9,397
Equipment, Vehicles Material and Supplies	35,504	30,134	34,040	99,678
Subcontract (Florida)	84,066	92,473	101,720	278,259
Total	359,169	386,166	425,674	1,171,009

Work Plan:

The work plan will be divided into four sections.

Southeast Asia
Central America
Corvallia-based staff
University of Florida (Aquatic Weeds)

Southeast Asia (Thailand).

Two agronomists will be stationed in Southeast Asia. One with responsibilities in general technical assistance and the other in research funded under a separate research project.

The time-phased plan of activity, will be broken into three periods. They are: A) July 1976-February 1977, B)March 1977-February 1978, and C) March 1978-February 1979.

A. July 1976-February 1977

1. Identify,secure and ship needed equipment ans supplies.

2. Two agronomists arrive in Southeast Asia - ETA, July 1976.

3. Contact and establish working relations with AID, Thai Government, NWSRI, regional research and extension organizations as well as international research organizations. The latter would include: IRRI, BIOTROP, Rodent Research Center (Philippines), REO, Mekong Committee, and IACP.

4. Develop agreement between Thai Government to obtain necessary counterparts and logistic support.

5. Promote awareness of weed-related damage to crop production to agricultural administrators and agricultural scientists through a series of short courses held in Thailand.

6. Identify key nationals with potential for scientific leadership and encourage them to pursue advanced graduate training. Help identify scholarship sources for the advanced training.

7. Provide on-the-job training to weed researchers in proper terrestial weed control techniques and methods by actually conducting field experiments. The weed researchers would include students from universities as well as NWSRI staff.

8. Examine the available weed control literature to determine inadequacies and devise plans for filling the needs.

9. Work cooperatively with research agronomist to identify research priorities and establishing field trials.

B. March 1977-February 1978

1. Continue on-job-training.

2. Design plans and initiate action on preparation of a series of of bulletins on weed control recommendations for food crops in Thailand, especially oriented to small and medium farmers.

3. Organize and conduct a series of short courses on weed research methodology.

4. Organize and conduct a series of short courses for weed extentionists demonstrating weed control methods.

5. Review and evaluate governmental, commercial and farm procedure for handling, storage, and control of herbicides.

6. Actively encourageand promote environmental and personal safety in the use of herbicides.

7. Develop educational materials on weed control methods and safe application methods.

C. March 1978-February 1979

1. Continue work previously started.

2. Evaluate and modify as required plans and procedures to develop weed control recommendations for major food crops.

3. Develop plans, and initiate action for a research program in pasture and rangeland weed and poisonous weeds.

4. Prepare reports and publications related to work activities.

Central America (Costa Rica).

The purpose of locating an agronomist in Costa Rica is to work with the Regional Office for Central America (ROCAP) in their multiple cropping effort. This is to be a multidisciplinary effort for all Central America. The specific plans of action of ROCAP are unavailable to us at this time, Obviously, most of the activities of the agronomist will be determined by the ROCAP plan. Therefore, a specific work plan cannot be written at present.

Corvallis-based Staff.

Project Leader. (2/3 GTS) Primarily administrative: coordinate project inputs, both human and commodities, from OSU Agronomic Crop Science and Agricultural Economics Departments. Provide general staff and budget management and carry primary responsibility for contacts with AID and national and international research organizations. The project leader is expected to visit project staff in each field location once or twice a year, and also to be responsible for close liaison with the AID/University of California project on pest management and environmental protection.

Weed Control Specialist. (2/3 GTS) In addition to helping the project leader provide direct in-field assistance and maintain liaison with other research agencies, the weed control specialist will have four primary functions:

- conduct research at Corvallis involving new weed control products and practices and forward the resulting information to project field staff, and to developing countries worldwide.

- conduct weed control literature research to assist OSU in-field staff design optimum test programs for specific crops and weeds as well as to answer inquiries from AID Missions and developing countries' research personnel.

- secure, and arrange for supply of, required research equipment, reference literature, etc., for in-field staff.

- serve as a consultant to developing countries, when required, by preparing material and participating in short courses and workshops.

Information Specialist. (2/ 3GTS) Implement broad and rapid utilization of the information developed through research conducted by the project through the following:

- cooperate with, and advise project staff on the publication and dissemination of information based on weed control research performed.

- maintain a worldwide list of the key weed control research, extension, and teaching personnel, especially in developing countries (over 3,600 entries as of April 1975).

- search, develop, and edit material for the IPPC INFOLETTER to include new developments in weed control research, available literature, meetings, etc., expedite distribution of INFOLETTER (to worldwide list) no less than quarterly.

- assume leadership for researching, editing, designing, assembling and publishing additional books and/or literature on weed control which appear to fulfill needs in developing countries.

- facilitate the processing of requests for information from OSU field staff, USAID Missions, and developing countries, and process, either directly, or with assistance from the technical staff.

- act as liaison with the OSU Public Information Office, mass media, and other channels, as applicable.

- carry out assigned administrative functions and serve as acting director in the project director's absence.

Fiscal Officer and Translator. (2/3 GTS) Activities cover a range of duties, including, but not limited to, the following:

- prepare budgets, and periodic financial reports for AID and campus use, and manage revolving funds for foreign-based staff staff members.

- Act as liaison with department, experiment station and university business offices with regard to project personnel and fiscal matters.

- translate, or arrange for translation of, letters, reports and notices.

- order supplies and equipment as needed.

-facilitate appointment of personnel including necessary university payroll procedures, AID clearances, etc.

AID 1020-28 (11-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY _____ to FY _____
Total U S Funding _____
Date Prepared: _____

Project Title & Number: Oregon GTS

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the food production of small farmers in LDCs by decreasing losses caused by weed infestations.	Measures of Goal Achievement: Increased harvests in countries participating in weed control programs.	Country statistics from Ministries of Agriculture. USAID reports. On-site observations.	Assumptions for achieving goal targets: Recipient countries give priority to food crop production.
Project Purpose: Assist world weed control community by: 1. training weed scientists. 2. improving interchange of information. 3. identifying magnitude of important aquatic weed problems. 4. developing integrated control systems.	Conditions that will indicate purpose has been achieved: End of project status. 1. Weed control included in national research programs in participating countries. 2. International exchange of weed research is strengthened. 3. Studies made on aquatic weed problems in tropical areas. 4. Aquatic weed control systems and alternatives developed.	1. LDC gov't reports. 2. Contractor reports. 3. Contractor reports. 4. Contractor reports.	Assumptions for achieving purpose: 1. Participating LDCs have personnel and material resources to support weed research. 2. International institutes and other weed research organizations able and willing to contribute to information network. 3. Host countries will facilitate conduct of aquatic weed studies. 4. Socio-cultural factors will not inhibit studies.
Outputs: 1. On-the-job training for LDC weed scientists. 2. Short courses and/or workshops in LDCs. 3. Response to problem situations and country integrated weed control programs. 4. Quarterly newsletter for LDC weed scientists. 5. Weed information publications. 6. Biological and socio-economic studies on aquatic weed problems.	Magnitude of Outputs: 1. 6000 man-days of OJT provided for scientists from at least 6 LDCs. 2. One regional workshop per year, two workshops in LDCs. 3. Dependent upon LDC and USAID requests; estimated at 4 per year. 4. Four issues of Weed Newsletter per year, sent to all LDCs. 5. Two special publications, plus annual reports of OSU/AID research, distributed to AID/W, USAIDs, and international institutes. 6. Socio-economic studies conducted in at least two tropical regions.	1. Contractor trip reports, annual reports. 2. Contractor trip reports, annual reports. 3. USAID correspondence, contractor reports. 4. AID/W observation, contractor reports. 5. AID/W observation, contractor reports. 6. Contractor reports.	Assumptions for achieving outputs: 1. LDCs indicate need for training, qualified personnel available. 2. USAIDs and LDCs desire technical assistance in weed control. 3. LDCs request technical assistance. 4. Worldwide interest is maintained in weed control. 5. Worldwide interest is maintained in weed control. 6. Host governments will collaborate in situation studies; no political nor cultural objections.
Inputs: 1. AID/W financial support. 2. Oregon State to provide technicians, home campus facilities to support project. 3. USAIDs and LDCs to provide participants and logistical support as needed in LDCs.	Implementation Target (Type and Quantity) 1. AID funding (000) FY76 360, FY77 380, FY78 420 2. OSU specialists-man/months Overseas 24 24 24 Home Campus 32 32 32 Supporting 25 25 25 3. Dependent upon requests from LDCs.	1. AID/W reports. 2. On-site observation Contractor reports. 3. Contractor reports. USAID correspondence.	Assumption for providing inputs: 1. AID will provide requested funding according to time schedule. 2. Contractor will have adequate qualified personnel available. University will continue to provide on-campus support. Commodity will be available and will be in place when needed. 3. LDCs will provide or find means to support in-country activities.