(BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS)

IDENTIFICATION DATA

A. REPORTING A.I.D. UNIT: S&T/AGR/AP (Mission or AID/W Office) (ES#)

B. WAS EVALUATION SCHEDULED IN CURRENT FY ANNUAL EVALUATION PLAN? yes ☒ slipped ☐ ad hoc ☐ Eval. Plan Submission Date: FY 88 Q 4

C. EVALUATION TIMING: interim ☒ final ☐ ex post ☐ other ☐

PD ABB-030

D. ACTIVITY OR ACTIVITIES EVALUATED (List the following information for project(s) or program(s) evaluated; if not applicable, list title and date of the evaluation report)

Project #	Project/Program Title (or title & date of evaluation report)	First PROAG or equivalent (FY)	Most recent PACD (mo/yr)	Planned LOP Cost ('000)	Amount Obligated to Date ('000)
931-0621	Spring x Winter Wheat	9/30/76	9/30/90	$5,095	$4,645

ACTIONS

E. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

Action(s) Required	Name of officer responsible for Action	Date Action to be Completed
1. Amend the Cooperative Agreement to:		
a. Continue the wheat breeding program as well as the barley program	F. Mertens E. Roche	November 1988
b. Increase cooperation with Great Plains Universities		
2. Prepare an extension of the project by 5 years for the signature of the Administrator	F. Mertens E. Roche	September 1989

(Attach extra sheet if necessary)

APPROVALS

F. DATE OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION: mo 8 day 5 yr 88

G. APPROVALS OF EVALUATION SUMMARY AND ACTION DECISIONS:

	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
Signature	F. Mertens	W. Kronstad	E. Roche	D. Bathrick
Typed Name				
Date:	9/27/88	11/1/88	3/30/89	3/31/89

C-008

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H. EVALUATION ABSTRACT (do not exceed the space provided)

The project's function is to:(1) collect,evaluate, improve through a special breeding program, and disseminate wheat and barley germplasm to plant breeders in LDCs to be used in the development of new cereal varieties adapted to local conditions, (2) provide graduate training in cereal improvement, (3) establish relationships with LDC-cereal research centers, and (4) serve as a resource center for cereal improvement. This midterm evaluation was conducted by an outside contract team to evaluate the project's achievements in relation to project goals and to make recommendations as to future planning. The team reviewed: (a) project documents and reports, (b) interviewed AID and OSU staff, local farmers, CIMMYT personnel, and (c) visited OSU facilities and four research stations in Oregon.

The evaluation team found the project to be on schedule in its progress towards the goals which were reduced because of AID budget cuts and which were only partly replaced by funding from the Oregon wheat growers and breweries. Winter cereals require a long period for development and only now are very promising lines of wheat ready for release in the next five years.

Specific findings and conclusions are:

1. Lines with genetic variability such as higher more stable yields and resistance to diseases that may cause serious crop losses in the U.S. and other wheat producing areas,have been developed.

2. Many promising winter wheat lines are in the advanced trial stage and the project should be extended by five years to allow time for release of the same.

3. A microcomputer database which is applicable to cereal research and which has been adopted by several institutions since it increased the breeding efficiency tremendously, has been developed.

4. The recently established barley program has achieved very significant results in the double haploid technique and hence should be continued with emphasis on utilization of new genetic technologies that can be productively integrated with the crop improvement training and network building activities.

5. National programs in Chile and Turkey have released winter habit varieties developed under this project. Argentina, Peru, and Bolivia are very near release of varieties.

6. Spring habit varieties developed from OSU material have been released in 19 developing countries. Worldwide it is estimated that these varieties cover around 10 million hectares, or about 10% of the total developing country wheat area.

7. Fifteen international students are currently enrolled in the program at an average cost of only $4,000 per year from the project. Because of the excellence of the project, students found support from other sources.

The evaluation team observed the following "lessons":

1. Long-term financing is essential to the success of a cereal breeding program since it takes 10 years to develop a new spring wheat variety and longer for winter wheat.

2. Land-grant institutions can encourage domestic support for international programs. As a result of the project's staff of convincing Oregon farmers of the benefits of the project to them by arranging tours to CIMMYT, visits with Mexican farmers and informing them of the source of breeding material with special characteristics, they are now supporting 29% of the project and the University lowered their overhead to 5%.

ABSTRACT

I. EVALUATION COSTS

1. Evaluation Team Name	Affiliation	Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (US$)	Source of Funds
D. Mitchell	Contractor	15	25,000	Program
J. Axtell	"	12		
P. Heisey	"	15		

COSTS

2. Mission/Office Professional Staff Person-Days (estimate) 21

3. Borrower/Grantee Professional Staff Person-Days (estimate) 50

A.I.D. EVALUATION SUMMARY PART II

1. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS AND RECOMMENDATIONS (Try not to exceed the 3 pages provided)
Address the following items:

- Purpose of activity(ies) evaluated
- Purpose of evaluation and Methodology used
- Findings and conclusions (relate to questions)
- Principal recommendations
- Lessons learned

Mission or Office: ST/AGR

Date this summary prepared: Sept. 23, 1988

Title and Date of Full Evaluation Report: Interim Evaluation of the Spring & Winter Wheat Project

Project Purpose: The Winter and Spring Wheat Project (931-0621) is implemented by S&T/AGR/AP through a cooperative agreement with Oregon State University to: (1) collect, evaluate, enhance, and disseminate wheat and barley germplasm; (2) provide graduate training in cereal improvement; (3) research centers; and (4) serve as a resource center for cereal improvement.

Evaluation Purpose and Procedures: The purpose of this external evaluation is to conduct a comprehensive examination of the performance and implementation of the project, specifically, to: (1) determine the capability of the cooperator to develop enhanced germplasm of winter and facultative types of wheat and barley, and the effectiveness in distributing germplasm to LDCs to be utilized in national and local breeding programs, and (2) assess the graduate training program for M.S. and Ph.D. students in various phases of cereal improvement. This evaluation covers the period from the beginning of the current agreement, January 1986 and July 1988.

The three-member evaluation team, contracted by Chemonics International, arrived in Corvallis, Oregon on July 11, 1988 to begin a two-week intensive review of the project with Oregon State University Cereal Research staff, CIMMYT representatives from Mexico and Turkey, and AID/ST/AGR representative, and with Oregon wheat growers and industry representatives. Site visits were made to Oregon research plots.

Findings and Conclusions: Generally, the evaluation team found the project to be exceptionally well implemented by a competent, mutually supportive OSU Cereal Research team. Specifically, the team found:

- An excellent working relationship exists between CIMMYT and OSU. Two representatives from Mexico and one from Turkey were present for the review. Sixty percent of CIMMYT spring wheat advanced lines can be traced to some spring & winter parentage derived from OSU germplasm. Furthermore, OSU has advised CIMMYT/Turkey on the computerization of their winter wheat database and CIMMYT/Mexico in the computerization of their field weighing system.

- Genetic diversity of wheat has been enhanced by the collection and evaluation of over 10,000 cultivars.

- Systematic crossing of winter and spring gene pools of wheat has significantly increased genetic variability for many traits including more durable disease resistance and higher, more stable grain yield.

- Genetic lines from several countries have resistance to diseases that may cause serious crop losses in the U.S. or other wheat producing areas.

SUMMARY

SUMMARY (continued)

- The barley breeding program, initiated in 1986, is in its initial stages but has already achieved some very significant results, the most exciting of these being the development of a doubled haploid technique, which could result in a considerable shortening of the breeding cycle.

- Developed a microcomputer database application for cereal breeding research. Through a shared database, project personnel can retrieve the most current agronomic, disease, quality, genetic, or yield information. Thus, poor performing breeding materials can be discarded as they are harvested.

- Fifteen international graduate students are currently enrolled in the program with three receiving stipends from A.I.D. project funds and others receiving thesis research support.

- The program is benefitting small farmers by selecting germplasm with greater stress tolerances obtained by combining genes from winter and spring materials.

- Spring habit varieties developed from OSU materials have been released by national programs in at least 19 developing countries. Worldwide, it is estimated that these varieties cover around 10 million hectare, or about 10% of the total developing country wheat area.

- National programs in Chile and Turkey have released winter habit varieties developed from the winter & spring program. Argentina, Peru, and Bolivia are very near release of varieties. South Africa has released a winter habit variety that has scored the most rapid increase of adoption ever recorded in that country.

- Because of the vernalization requirement, the winter wheat program has progressed more slowly than the spring wheat program. Several very promising cultivars have been developed.

- About 30% of the advanced lines now being developed for use in Oregon soft white winter wheat are derived from winter & spring crosses. A hard red winter wheat is nearing release to Oregon farmers.

- Financial support by the Oregon Wheat Growers League amounts to about 27% of the cereal research budget. They recently provided $500,000--together with a matching fund by the Oregon Legislature--to endow a wheat research chair at OSU. Dr. Warren Kronstad, manager of this project was appointed to the chair. The Wheat Growers League is vocal in support of the international aspects of the program and feel they are benifitting from the sizeable collection of barley and wheat enhanced germplasm at OSU.

Principal Recommendations: The evaluation team recommends:

- o that project funding be continued for at least five years to allow time for release of enhanced winter wheat germplasm, now in advanced trials, to national wheat breeders;

- o continuation of the germplasm enhancement program in winter barley with special emphasis on utilization of new genetic technologies that can be productively integrated with the drop improvement training and network building activities;

- o a five-year funding horizon for the project with a mid-term review to assess future funding beyond the five-year cooperative agreement. Promising new areas for winter wheat and barley research should be incorporated into a redirected future project;

- o funds be included in the project for OSU staff to visit international screening nurseries, conduct in-country symposia, and visit LDC cereal breeders or that USAID project management seek other funding to observe the utilization of advanced breeding lines in LDC breeding programs and to provide OSU staff with feedback from LDC breeders on adaptability of breeding lines; and

- o increased collaboration with appropriate Great Plains universities to provide more in-depth screening opportunities and occasional alternative degree training opportunities for wheat and barley scientists from LDCs.

Lessons Learned:

- o Long-term financing is essential to the success of a cereal breeding program. Generally, it takes about 10 years to develop a new variety of spring wheat, longer for winter wheat.

- o Land-grant institutions can encourage support for international research efforts. OSU's international cereal research program receives both financial and verbal support from Oregon wheat growers. This has been encouraged by OSU staff by (a) arranging tours so that Oregon farmers may visit CIMMYT and meet with Mexican farmers and (b) informing them of the source of breeding materials with special characteristics. Screening nurseries are located in farm fields in various parts of Oregon; these are frequently visited by international guests.

- o A graduate program coupled with a breeding program establishes a long-term relationship beyond international boundaries. Wheat breeders from many developing countries periodically visit Oregon trials to select breeding materials for their programs. In the 20-plus years that Oregon has participated in international wheat programs, 98 graduate students have completed training at OSU and many have returned to national wheat breeding programs. A healthy rapport exists with these former students and OSU. In addition, the relationship with CIMMYT and, more recently, with ICARDA has added a further international dimension.

ATTACHMENTS

K. ATTACHMENTS (List attachments submitted with this Evaluation Summary; always attach copy of full evaluation report, even if one was submitted earlier)

Evaluation Report--Graduate Training Assessment

MISSION COMMENTS ON FULL REPORT

L. COMMENTS BY MISSION, AID/W OFFICE AND BORROWER/GRANTEE

S&T/AGR comments:

Three outstandingly qualified experts, who did an excellent job, comprised the evaluation team. The evaluation was very professional and resulted in a short, precise assesment report. All questions of the Scope of Work were answered; the conclusions are valuable and the recommendations are expressed in the following proposed project changes:
1. The project should be amended since the wheat, as well as the barley program, should be continued. The former because many excellent lines are in the final testing stages before release after 13 years of development. The program is very efficient and is essential in complementing the CIMMYT program, further, the Oregon wheat growers are supporting the program financially and politically. The barley program, supported in part by the brewing industry, is very successful in the development of new biotechnological methods, important for the acceleration of plant breeding.
2. The project should be extended by an additional 5 years for the same reasons mentioned in one above.

OSU Comments:

The spring x winter wheat program from its inception, successfully addressed the need to: a) establish a global network to solve a clearly defined and widely shared problem, b) achieve a sustainable agriculture, c) develop collaborative research efforts with developing and developed countries rather than providing technical assistance and d) successfully convinced a U.S. commodity group of the importance of supporting international research activities.

The evaluation team did an excellent job in identifying the achievements and contributions made by the project including the many economic advantages of having the program at Oregon State University and the positive interaction with International Centers.

Effectiveness of the spring x winter wheat program has been adversely affected by the uncertainty of future funding, the 25% reduction in support and the addition of barley germplasm enhancement without additional support. Major project outputs including the screening and international yield trials, number of graduate students, in-country symposia and international travel were eliminated or reduced. The unique environment, institutional, and genetic constraints facing winter and facultative wheat and barley production requires distinct research objectives and methodologies. As clearly identified by the evaluation team, these issues are being addressed including the interjection of some biotechnology to complement the conventional breeding and graduate training programs.