PD-AAC-801-F1 9310471-③

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PROJECT EVALUATION SUMMARY
(Submit to MO/PAV after each project evaluation)

1. Mission or AID/W Office Name	2. Project Number
DS/AGR/FCP	931-0471

3. Project Title

Wheat Protein

4. Key project dates (fiscal years)			5. Total U.S. funding life of project
a. Project Agreement Signed FY 1975	b. Final Obligation FY 1978	c. Final input delivered FY 1979	$ 3,866,000

6. Evaluation number as listed in Eval. Schedule	7. Period covered by this evaluation		8. Date of this Evaluation Review
	FROM: 3/76 Month/year	TO: 4/78 Month/year	04 /28/78 month/day/year

9. Action Decisions Reached at Evaluation Review, including items needing further study (Note--This list does not constitute an action request to AID/W. Use telegrams, airgram, SPARS, etc., for action)	10. Officer or Unit responsible for follow-up	11. Date action to be completed
a. Organize an international Winter Wheat Conference to convey project development research to LDCs.	AID/USDA/U. of Neb.	3/80
b. Conduct nutritional analysis of best LDC commercial varieties compared with current international winter wheat nursery.	USDA/U. of Neb.	6/79
c. For final report conduct survey of best germplasm and use being made of same in LDC i.e., breeding line or released variety.	USDA/U. of Neb.	6/79
d. Increase opportunity for LDC staff training in nutritional enhancement of wheat.	USDA/AID	6/79
e. Maintain linkages with and make use of expertise developed in this project in future wheat development program i.e., Title XII	AID/USDA	Continuing
f. Contractor's terminal report should include specifics as indicated under 23 special comments.	USDA/U. of Neb.	6/79

12. Signatures:

Project Officer	Mission or AID/W Office Director
Signature: Keith M Byergo	Signature: Dean F. Peterson
Typed name: Keith M. Byergo	Typed name: Dean F. Peterson
Date:	

13. SUMMARY: This project which was initiated in 1966 terminates December 31, 1978. This summary will draw on the accomplishments over the full period to indicate purpose achievement and end of project status. While the AID contract has been with the University of Nebraska the subject has been a joint effort between USDA/SEA/FR and the University of Nebraska.

Superior germplasm for high protein and increased lysine were identified in the form of Atlas 66, Nap Hal and Favorit as effective donors of high protein genes and Nap Hall, CL 13449 and (11344) as donors of increased lysine. This material along with germplasm incorporating both the high protein, high lysine genes and the lines having superior agronomic characteristics has been distributed and is currently being used in 40 countries at 60 different sites. 110 new varieties from 25 different countries have been evaluated in the International Winter Wheat Protein Nursery (IWWPN) since 1969. With the introduction of these varieties and the cooperating country varieties developed from germplasm distributors, improved varieties for all of the major agroclimatic region have been developed.

Training has been accomplished by involving graduate students directly in the research program. In the past, ten students from eight countries have worked with the research team. Currently seven students from foreign countries and seven students from the U.S. are working with the team as part of their advanced degree program.

The contract staff has worked in close cooperation with CIMMYT and Oregon State University in providing enhanced protein lines for both spring and winter wheat improvement. ICRISAT and ICARDA have also cooperated with the Nebraska staff.

Three highly successful international wheat conferences have been organized by the wheat team. The staff has reported on the wheat protein research at more than 30 conferences and published over six research reports on their wheat research.

Small animal and human bioassays have consistently shown the superior nutritional value of the increased protein and lysine content of the improved wheat varieties. Significant higher weight gain and feed efficiency ratios were the indicators in the bioassays.

End of Project Status: As indicated by the summary the outputs and purposes have been accomplished and goals exceeded. Due to the importance of continued research in this area, the University of Nebraska and SEA/FR have agreed to continue the priority areas of research starting from January 1, 1978. These areas include:

1. Developing new nutritionally and agronomically superior wheat breeding material for national and international performance trials.

2. Chemical and physical studies to determine processing and nutritional quality factors.

3. Identify agronomically and nutritionally superior broadly adapted winter wheat varieties and study the influence of soil and environmental factors on yield and quality.

4. Strengthen wheat research in LDCs through germplasm distribution; disseminating research information; linking national and international programs; conducting conferences and workshops and cooperative nurseries; and training of U.S. and international students interested in LDC wheat improvement.

As planned now the work on international nurseries and grain quality testing will be accomplished under a new AID project until December 31, 1979 at which time SEA/FR will assume responsibility for these activities.

In summary, the project objectives and purposes will be accomplished at termination and a continuing activity established with SEA/FR and the University of Nebraska for the major activities of the project.

14. EVALUATION METHODOLOGY - A regular evaluation was conducted. The project manager was ably assisted by Dr. Warren Kronstad, Oregon State University, Professor of Agronomy and Wheat Research Leader and by Dr. Lee Briggle, USDA/SEA/Federal Research National Progress Staff for wheat research. (See Annex A for list of participants.) Project documentation was provided Drs. Kronstad and Briggle as background information. Discussions were also held with regional bureau agriculture staff. The SEA/University of Nebraska staff made a formal presentation on project activities. This presentation was evaluated on the basis of project objectives as contained in the contract and the "Log Frame Matrix". Further discussions were held with the project staff and a summary report written. The University of Nebraska should be commended for the high interest shown in the project by the Dean; Experiment Station Director; Director of International Programs and the Agronomy Department Head.

15. DOCUMENTS TO BE REVISED TO REFLECT DECISIONS NOTED PAGE 1 (OTHER SIDE:) No document revision required.

16. EVALUATION FINDINGS ABOUT EXTERNAL FACTORS - Four external factors influenced the emphasis placed on wheat protein research by donor agencies towards the latter part of the project. These were:

1. High levels of world-wide wheat stocks.

2. Progress in wheat improvement both in developed and developing countries.

3. Protein content emphasis decreasing as compared to total caloric content from the nutritional standpoint.

4. A doubt that sufficient genetic variability exists in wheat to warrant breeding programs for lysine enhancement.

While these did not directly influence the current project they were factors which caused a reduced emphasis in overall wheat research. All four factors can be questioned as to their validity to influence future wheat research, however currently these factors bear heavily on decisions to fund future wheat research.

Assumptions as detailed in the "Log Frame Matrix" are still valid through varying degrees. Neither extension nor research staff in LDCs are self sustaining. They will require close linkage over a continuing period to maintain and enhance competence. It must be realized that the developing and maintaining of linkages between LDC and DC research and extension institutions are the answers to development. In truth the job is never done. Isolate any research institution from its peers and it soon dies.

This is especially true in LDCs where opportunities for interaction within their own country are often limited.

17. GOAL/SUBGOAL: To increase the quantity and nutritional value of food crops in LDCs. As discussed in the summary LDCs are using project developed germplasm to develop superior new locally adopted varieties. This in turn increases local production.

18. PURPOSE: To make available to developing countries high-yielding nutritious germplasm of wheat with multiple resistance to moisture and temperature stresses, diseases and insects, together with improved practices for their cultivation.

Through the project's international nurseries, improved breeding lines and in some instances cultivars (Bolal and Bezostaya in the Middle East and Lancota in the U.S. great plains) have been developed and distributed. Through conferences, consultancies and reports, improved production techniques have been distributed. EOPs as defined in the "Log Frame" will be achieved by project termination.

19. OUTPUTS-INPUTS: Output attainment has required more time but no more funds and by termination outputs will exceed project goals.

The new project to continue the nurseries and quality testing service is part of the need for maintaining DC/LDC linkages until USDA/SEA can assume the responsibility.

The contract has been particularly successful in developing broad linkages between DC and LDC winter wheat programs. Breeding materials from Eastern Block countries previously unavailable to LDCs is now in use in LDC breeding programs. Management problems were minimal considering the long term of the contract and changes in AID management. The project extension is seen as a way to more efficiently use project funds and allow for an orderly transition to USDA/University of Nebraska management.

The contribution of high protein-high lysine germplasm to the CIMMYT and Oregon State wheat programs in LDCs was another significant accomplishment of the project.

20. UNPLANNED EFFECTS: Bioassays and nitrogen fixation studies did not produce positive results. Several pieces of new field research equipment were developed and are now in wide use. These include moisture testers, seed cleaners, plot and head cutters.

21. CHANGES IN DESIGN OR EXECUTION: No changes in design or execution recommended other than previously discussed i.e., to continue the international nurseries one more year.

22. LESSONS LEARNED: Through the life of the project secondary objectives were added. These included studies on nitrogen metabolism, photosynthetic efficiency, nitrogen fixation, and rat bioassays. These tended to dissipate resources which could better have been used on the primary objectives. Caution should be exercised in the future against expanding a project over too broad an area particularly without commenserate resources being added.

23. SPECIAL COMMENTS: This project research indicates that wheat has more potential for a higher percentage of protein and lysine production per unit of grain without a yield or grain quality reduction than other cereals. Given the broad general adaptation and use of wheat in the LDCs this would point towards increased research on wheat protein enhancement. The University of Nebraska and USDA are to be commended for continuing the major elements of the project. Their past cooperative efforts under contract to AID are to be commended for the high professional quality of their research work and strong program in training, reporting and nursery management and their high caliber international conferences.

As a result of this contract effort, India and Pakistan are starting national protein enhancement programs and Sweden has an international program underway in seven countries.

Terminal report should include very specific details on overall accomplishments including:

a. The provision of specific improved germplasm to specific DC and LDC countries and/or international centers.

b. Specific disease resistant wheat strains that have been provided to the LDCs and DCs. Should include specific disease(s) and countries.

c. Plant strains, resistant to specific insects that have been provided to LDCs and DCs. Should include specific insects and countries.

d. Plant strains provided to LDCs and DCs that display resistance to moisture and temperature stress.

e. Plant strains or varieties that display good agronomic characteristics yet display multiple resistance to factors indicated in items 2, 3 and 4.

f. Specific cultivation practices developed under this project and countries (LDC/DC) that have adopted them.

g. Specific reference should be made to nutritional value of the germplasm tested and released.