

A.I.D. EVALUATION SUMMARY - PART I

PL 772-936

X1

- 1. BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS.
- 2. USE LETTER QUALITY TYPE, NOT "DOT MATRIX" TYPE

IDENTIFICATION DATA

<p>A. Reporting A.I.D. Unit:</p> <p>Mission or AID/W Office <u>ST/AGR/AP</u> (ES# _____)</p>	<p>B. Was Evaluation Scheduled In Current FY Annual Evaluation Plan?</p> <p>Yes <input checked="" type="checkbox"/> Slipped <input type="checkbox"/> Ad Hoc <input type="checkbox"/></p> <p>Evaluation Plan Submission Date: FY <u>89</u> Q <u>2</u></p>	<p>C. Evaluation Timing</p> <p>Interim <input checked="" type="checkbox"/> Final <input type="checkbox"/></p> <p>Ex Post <input type="checkbox"/> Other <input type="checkbox"/></p>
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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 No.	Project /Program Title	First PROAC or Equivalent (FY)	Most Recent PACD (Mo/Yr)	Planned LOP Cost (000)	Amount Obligated to Date (000)
936-4136	Special Constraints Research	85	9/89	4,200	2,391

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. Conduct a study to find alternatives to present management in order to reduce present overhead rate burdens of the project.	F. Mertens	Sept. 89
2. Extend the project for five years.	F. Mertens	Dec. 89
3. Change the project management to improve efficiency and cost effectiveness of the project.	F. Mertens	Jan. 90

(Attach extra sheet if necessary)

APPROVALS

F. Date Of Mission Or AID/W Office Review Of Evaluation: _____ (Month) _____ (Day) _____ (Year)

G. Approvals of Evaluation Summary And Action Decisions:

	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
Name (Typed)	F. Mertens	S. Wiggins	M. Blakeney	D. Bathrick
Signature	<i>F. Mertens</i>	<i>S. Wiggins</i>	<i>M. Blakeney</i>	<i>D. Bathrick</i>
Date	7/19/89	8/2/89		7/6/89

ABSTRACT

H. Evaluation Abstract (Do not exceed the space provided)

The project's function is to overcome specific constraints to technological breakthroughs which the International Agricultural Research Centers (IARCs) themselves lack the capacity to address. This is accomplished through collaborative research funded grants to U.S. research institutions and scientists. This evaluation was conducted by an outside contract team to evaluate the project's achievements in relation to project goals, the quality and appropriateness of the research, and the efficiency of the research and to make recommendations as to future planning. The team: (a) reviewed project documents and reports, (b) interviewed AID, USDA/OICD, USDA/CSRS staff, principal investigators and other researchers at the institutions and CIMMYT personnel, (c) communicated with all involved IARCs and other researchers, and (d), visited seven research sites at four institutions and one site at CIMMYT.

The evaluation team found the project to be on schedule in its progress towards the goals which were reduced by more than 50% because of AID budget cuts and increased overhead rates by the implementing agency USDA/OICD.

Specific findings and conclusions are:

1. Subprojects funded under the project are of high quality and appear to be useful to both the IARCs and the US institutions.
2. Substantial contributions towards the research projects have been provided by the U.S. institutions and the IARCs.
3. There has been a considerable spread effect and utilization of the project outputs.
4. There is a great potential for benefits to both U.S. Science and U.S. Agriculture through this project.
5. The project has identified important constraints at the IARCs and excellent U.S. scientific resources for collaborative research.
6. The project should be continued for an additional five years and greatly expanded
7. Substantial improvements in efficiency and cost effectiveness should be provided for when the project is extended.

C O S T S

I. Evaluation Costs

1. Evaluation Team		Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (U.S. \$)	Source of Funds
Name	Affiliation			
J. Robins	Contractor	23	35,000	Program
T. Ronningen	Contractor	23		

2. Mission/Office Professional Staff
Person-Days (Estimate) 20

3. Borrower/Grantee Professional
Staff Person-Days (Estimate) 6

A.I.D. EVALUATION SUMMARY - PART II

S U M M A R Y

J. Summary of Evaluation Findings, Conclusions and Recommendations (Try not to exceed the three (3) pages provided)

Address the following items:

- | | |
|--|--|
| <ul style="list-style-type: none"> • Purpose of evaluation and methodology used • Purpose of activity(ies) evaluated • Findings and conclusions (relate to questions) | <ul style="list-style-type: none"> • Principal recommendations • Lessons learned |
|--|--|

Mission or Office:

S&T/AGR/AP

Date This Summary Prepared:

July 11, 1989

Title And Date Of Full Evaluation Report: Evaluation of the Collaborative Research Constraints for Intl. Agr. Research Centers Projects.

1. Project Purpose

The purpose of this activity is to overcome specific constraints to technological breakthroughs which the IARCs themselves lack the capacity to address. This is accomplished through collaborative research funded through grants to U.S. research institutions and scientists.

Evaluation Purpose and Procedures

This evaluation is to assess the degree of progress toward achieving the goal and purpose of the Collaborative Research on Special Constraints for International Agricultural Research Centers Project (936-4136). This includes:

- 1) Evaluation of the system for implementation and management of the overall project and sub-projects
- 2) Evaluation of the relevance, quality, progress, cost effectiveness, adequacy of funding and contribution of the sub-projects
- 3) Recommendations for future direction.

The team leader began work April 24, 1989 and the Research Specialist/Agronomist joined him April 26, 1989 in Washington, D.C. Documents were reviewed and personnel in AID and USDA/CSRS were interviewed. The principal investigator and associates at the USDA research center at Beltsville, Maryland provided a detailed presentation of one of the collaborative projects. From May 1 to May 10, site visits were made to three U.S. universities and two IARCs. Detailed discussions were held with scientists and administrators involved in nine of the 27 sub-projects funded through the project. Upon return to Washington, D.C., additional interviews in USDA and AID and a debriefing for AID and others was held, and a draft report was completed on May 17. Following AID comment on the draft, the Team Leader completed the final draft on June 12, 1989.

3. Findings and Conclusions

Findings:

- 1) Although operating at funding levels considerably less than projected in the project paper, the project has identified important constraints at the IARCs and excellent U.S. scientific resources to collaborate in resolving them. Relevance to IARC programs and thus to problems of LDCs is high.
- 2) Sub-projects funded under the project are of high quality and up to now appear to be very productive. The results appear to be useful to both the IARCs and the U.S. institutions.

- 3) Substantial technical inputs beyond those funded by the project have been made by both the IARCs and the U.S. institutions involved in sub-project activity.
- 4) Collaboration has extended both horizontally and vertically at both U.S. institutions and IARCs. Even at this early stage, there is evidence of the spread and utilization of project outputs.
- 5) There is considerable evidence that the project has stimulated development of existing linkages and enhanced new linkages between the U.S. agricultural science system and the IARCs, well beyond the specific funded sub-projects.
- 6) The project is quite consistent with AID mandates, policies and guidance documents.
- 7) There is no apparent duplication or conflict between this project and other AID funded activities, i.e. AID/SCI, S&T/RUR, or small activities programs. We think, on the other hand, that there is complementarity with other projects in S&T/Agr, notably the CRSPs, the Biotechnology and Tissue Culture projects, the International Benchmark Soils Network for Agricultural Technology (IBSNAT), and the small grain activities.
- 8) There is great potential for benefits to both U.S. science and U.S. agriculture through this project.
- 9) USDA's management of the activity has been competent and of good technical quality, although incurring high transactional costs.
- 10) There was considerable concern expressed about the low level of funding for both the total project and the sub-projects. Projects funded to date have only scratched the surface of opportunities amenable to this approach.
- 11) The process of sub-project selection, although highly rigorous, has high transactional costs, i.e. fiscal and human resources of both the IARCs and U.S. institutions. There is a pervading view among those that we talked with that there was substantial "overkill" given the small number of grants that could be made. Data provided indicate that the winnowing process leaves a very high disappointment to satisfaction ratio.

Conclusions:

- 1) The project even at this infant stage has demonstrated sufficient benefits to both U.S. and IARC research programs to warrant continuation.
- 2) If continued, the project should be expanded substantially in order to more fully capture the opportunities that this approach embraces.
- 3) Substantial improvements in efficiency and cost effectiveness are possible without significant loss of rigor in project selection or quality of performance. These should be implemented if the project is extended.

4. Recommendations:

1) We recommend extension of the project for a second five-year cycle and expansion of annual funding to at least the level projected in the original project.

2) We urge substantial simplification in the solicitation, review and screening process to conserve both fiscal and human resources.

3) We suggest a follow-up technical assessment of the 27 sub-projects funded by the project to date, after results from all of them are known. The IARCs whose research constraints were addressed can provide evaluation of the impacts.

ATTACHMENTS

K. Attachments (List attachments submitted with this Evaluation Summary; always attach copy of full evaluation report, even if one was submitted earlier; attach studies, surveys, etc., from "on-going" evaluation, if relevant to the evaluation report.)

One Evaluation Report

COMMENTS

L. Comments By Mission, AID/W Office and Borrower/Grantee On Full Report

ST/AGR Comments:

Two outstandingly qualified experts, who did an excellent job, comprised the evaluation team. The evaluation was very professional from the research standpoint and provided excellent project summaries, but fell short in recommendations with respect to increasing the efficiency of the project, partly since the time provided for the evaluation was short and, partly, since the project manager, under the new evaluation rules, did not have the opportunity to guide the team re priorities of questions to be answered. The conclusions are valuable and the recommendations are expressed in the following proposed project changes:

1. The project should be amended since the research provided is of high quality and of excellent value to the IARCs and the U.S. research and farm community. It established an access for the U.S. research community to international agricultural research and attracts substantial technical inputs beyond those funded by the project. The management of the project has been competent and of good technical quality.
2. Since the evaluation team recommended substantial improvement in project efficiency, but did not make a viable, practical recommendation, a follow-on survey will be required to solve this important issue.
3. The project should be extended by an additional 5 years for the same reasons mentioned.

USDA/CSRS Comments

The evaluation team clearly identified both the strong and the weak points in the Special Constraints program. Although they visited relatively few sites and scientists the ones they did visit were representative of those in the program. Their recommendations will be of value to Program managers/Coordinators and will help make the program more effective.

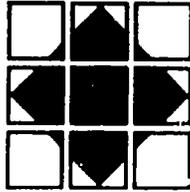
The principal shortcoming of the evaluation was lack of a strong recommendation about how to reduce the anticipated increase in overhead costs charged by USDA/OICD and those of the U.S. institutions. It is suggested that USDA/OICD overhead costs be drastically reduced or eliminated since they act primarily as a pass through agency for the transfer of funds from AID to USDA/CSRS. Further, it is recommended that overhead at U.S. institutions be limited to 25% in the future as will be done with Competitive Grants, as a result of House and Senate recommendations.

Evaluation of the
Collaborative Research on Special Constraints for
International Agricultural Research Centers Project
(936-4136)

Prepared for:
S&T/AGR/AP
Agency for International Development
Washington, D.C.

Prepared by:
John S. Robins, Team Leader
Thomas S. Ronningen, Research Specialist, Agronomist

June 1989



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ISA 63037

Evaluation of the
Collaborative Research on Special Constraints for
International Agricultural Research Centers Project
(936-4136)

Prepared for:

S&T/AGR/AP

Agency for International Development

Washington, D.C.

Prepared by:

John S. Robins, Team Leader

Thomas S. Ronningen, Research Specialist/Agronomist

June, 1989

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- Annex F - Communications from Program Participants
- Annex G - Responsiveness to S&T/Agr Project Selection Criteria

LIST OF ACRONYMS

Agr	Office of Agriculture, AID/S&T
AID	Agency for International Development
AP	Agricultural Production Division, S&T/Agr
ARS	Agricultural Research Service, USDA
AVRDC	Asian Vegetable Research and Development Center
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
CIP	International Potato Center
CRSP	Collaborative Research Support Program
CSRS	Cooperative State Research Service, USDA
FA	Directorate for Food and Agriculture, AID/S&T
IARC	International Agricultural Research Center (or Institute)
IBSNAT	International Benchmark Soils Network for Agricultural Technology
ICARDA	International Center for Agricultural Research in Dry Areas
ICIPE	International Center for Insect Physiology and Ecology
ICRISAT	International Center for Research in the Semi-arid Tropics
IFDC	International Fertilizer Development Center
IITA	International Institute for Tropical Agriculture
ILCA	International Livestock Center for Africa
ILRAD	International Laboratory for Research on Animal Diseases
IRRI	International Rice Research Institute

OICD Office of International Cooperation and
Development, USDA

PRC Project Recommendation Committee

RUR Office of Research and University Relations,
AID/S&T

S&T Science and Technology Bureau, AID

SCI Office of the Science Advisor, AID

USDA United States Department of Agriculture

Executive Summary

1. Project Purpose

The purpose of this activity is to overcome specific constraints to technological breakthroughs which the IARCs themselves lack the capacity to address. This is accomplished through collaborative research funded through grants to U.S. research institutions and scientists.

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This evaluation is to assess the degree of progress toward achieving the goal and purpose of the Collaborative Research on Special Constraints for International Agricultural Research Centers Project (936-4136). This includes:

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3. Findings and Conclusions

Findings:

- 1) Although operating at funding levels considerably less than projected in the project paper, the project has identified important constraints at the IARCs and excellent U.S. scientific resources to collaborate in resolving them. Relevance to IARC programs and thus to problems of LDCs is high.

2) Sub-projects funded under the project are of high quality and up to now appear to be very productive. The results appear to be useful to both the IARCs and the U.S. institutions.

3) Substantial technical inputs beyond those funded by the project have been made by both the IARCs and the U.S. institutions involved in sub-project activity.

4) Collaboration has extended both horizontally and vertically at both U.S. institutions and IARCs. Even at this early stage, there is evidence of the spread and utilization of project outputs.

5) There is considerable evidence that the project has stimulated development of existing linkages and enhanced new linkages between the U.S. agricultural science system and the IARCs, well beyond the specific funded sub-projects.

6) The project is quite consistent with AID mandates, policies and guidance documents.

7) There is no apparent duplication or conflict between this project and other AID funded activities, i.e. AID/SCI, S&T/RUR, or small activities programs. We think, on the other hand, that there is complementarity with other projects in S&T/Agr, notably the CRSPs, the Biotechnology and Tissue Culture projects, the International Benchmark Soils Network for Agricultural Technology (IBSNAT), and the small grain activities.

8) There is great potential for benefits to both U.S. science and U.S. agriculture through this project.

9) USDA's management of the activity has been competent and of good technical quality, although incurring high transactional costs.

10) There was considerable concern expressed about the low level of funding for both the total project and the sub-projects. Projects funded to date have only scratched the surface of opportunities amenable to this approach.

11) The process of sub-project selection, although highly rigorous, has high transactional costs, i.e. fiscal and human resources of both the IARCs and U.S. institutions. There is a pervading view among those that we talked with that there was substantial "overkill" given the small number of grants that could be made. Data provided indicate that the winnowing process leaves a very high disappointment to satisfaction ratio.

Conclusions:

1) The project even at this infant stage has demonstrated sufficient benefits to both U.S. and IARC research programs to warrant continuation.

2) If continued, the project should be expanded substantially in order to more fully capture the opportunities that this approach embraces.

3) Substantial improvements in efficiency and cost effectiveness are possible without significant loss of rigor in project selection or quality of performance. These should be implemented if the project is extended.

4. Recommendations:

1) We recommend extension of the project for a second five-year cycle and expansion of annual funding to at least the level projected in the original project.

2) We urge substantial simplification in the solicitation, review and screening process to conserve both fiscal and human resources.

3) We suggest a follow-up technical assessment of the 27 sub-projects funded by the project to date, after results from all of them are known. The IARCs whose research constraints were addressed can provide evaluation of the impacts.

Evaluation Report

SECTION 1 Introduction and Background

1.1 Summary Scope of Work

The evaluation will carry out a comprehensive examination of the performance and implementation of Project 936-4136, Collaborative Research on Special Constraints for International Agricultural Research Centers (IARC), in accordance with the scope of work of the Participating Agency Service Agreement (PASA) with the U.S. Department of Agriculture (USDA) and the Agency for International Development (AID) Project Paper. The capability and effectiveness of the project to jointly carry out research between U.S. institutions and IARCs will be evaluated. The two person evaluation team will provide recommendations for future project work, funding levels and implementation mode.

Team members were:

Dr. John S. Robins, Institutional Development Specialist/
Team Leader

Dr. Thomas S. Ronningen, Research Specialist/Agronomy

1.2 Methodology

The team leader began work on April 24, 1989 and the Research Specialist/Agronomist joined him on April 26, 1989 in Washington, D.C. Documents were reviewed and personnel in AID and USDA/CSRS were interviewed. The principal investigator and associates at the USDA research center at Beltsville, Maryland provided a detailed presentation of one of the collaborative projects. From May 1 to May 10, site visits were made to three U.S. universities and two IARCs. Detailed discussions were held with scientists and administrators involved in nine of the 27 sub-projects funded through project. Upon return to Washington, D.C., additional interviews were held in USDA and AID and a debriefing was conducted for AID and others. A draft report was completed on May 17. Following AID comment on the draft, the Team Leader completed the final draft on June 12, 1989.

1.3 Project Description Summary

Research efforts by IARCs often reach an impasse and information cannot be generated on how to improve food production because IARCs lack specialized facilities, such as highly technical, costly equipment, or specifically trained personnel. In these instances, the IARCs' research efforts need help. There are many U.S. institutions which are uniquely qualified to assist IARCs in solving those problems. If an IARC cannot solve a special research problem, a U.S. institution, with interests similar or parallel to the IARC, will be selected and awarded a

grant to assist the IARC. Generally, these special research problems should be solved within two years. No research grants are intended for longer than three years. The USDA/CSRS will carry out this program for AID under a PASA implemented through USDA/OICD.

SECTION 2 Project Rationale and Description

2.1 Background and Rationale

As documented in the project paper, AID is committed to encourage and foster global networks of mutually supportive research, information and technical assistance in priority areas, especially agriculture. AID Policy Determination No.47 states: "Networks are being encouraged to achieve critical massing of resources and efforts for breakthroughs on the important LDC problems." Coordinating or networking resources achieves economies in the utilization of human and capital resources and builds mutually reinforcing knowledge on common problems at widely separated locations.

A 1980 CGIAR report noted a slowdown in the rate of growth in the international agricultural research system; enumerated a number of gaps in research programs; indicated that developing countries and international centers rely heavily on developed countries for generation of scientific knowledge and ideas; and stressed the need for more back-up, especially in research.

Cooperation between IARCs and U.S. research institutions has been based largely upon small informal networks between center researchers and a few U.S. scientists. Only a very small fraction of the human and other resources available within U.S. institutions have been tapped. All parties could benefit by increased interaction within the international research network.

2.2 Project Goal

The goal of the project is to increase agricultural production and food availability in LDCs through the IARC research programs. The project supports increased collaboration, communication and coordination within the international research network. Project activities concentrate on constraints which inhibit technological breakthroughs and affect critical aspects of food production and farming systems in IARC programs.

2.3 Project Purpose

The project purpose is to overcome specific obstacles to technological breakthroughs which the IARCs themselves lack the capacity to address. This will be accomplished through cooperative and joint research funded through grants to U.S. research institutions or scientists.

2.4 Project Activities

The project funds small, discrete cooperative research activities between scientists at U.S. institutions and IARCs.

Research findings provide essential knowledge or methodologies that can lead to greater output or production technologies by the IARCs. The process also contributes to enriching U.S. professional capacity in tropical and subtropical agriculture, generating knowledge and/or products relevant to U.S. agriculture.

Grants made to U.S. research institutions or scientists are short-term (2-3 years). Total cost was limited to \$150,000 for the 1985-86 subgrants and to \$90,000 in 1987, 1988 and 1989. No project is funded unless the IARC and the AID Grants Recommendation Committee (GRC) concur on the proposed research on a special constraint. The Cooperative State Research Service (CSRS) of USDA implements this program through a PASA with the Office of International Cooperation and Development (OICD).

Research is of three types:

- Finding solutions for specific problems encountered by the IARCs in their programs
- Development of new knowledge to allow IARCs to enhance the scope of their programs
- Development of research methodology, including laboratory work.

Research is conducted by U.S. scientists, postdoctoral fellows and/or graduate students either at research institutions in the U.S., at the IARCs, or at equally appropriate sites. A majority of the research is done at U.S. universities because of their technical personnel and facilities.

2.5 Participants and Responsibilities

AID staff, IARC directors, U.S. research institutions, USDA/CSRS, and members of peer review panels will work together to develop and implement this program. In general, approval of proposed research will be based on (1) the relevance of the constraint to a specific IARC program, (2) probability of impact if the constraint is removed and (3) capacity of the proposing U.S. institution or individual to complete the proposed research activity. An ad hoc GRC composed of representatives from AID and other Washington-based agencies and organizations provides oversight and guidance to USDA/CSRS in carrying out the project. Peer review panels organized and managed by CSRS provide scientific counsel to CSRS and the GRC. The GRC bases its approval of grant awards on the recommendations of the peer panel and the reaction of the appropriate IARC Director General.

As a first step, AID asks the IARC Directors General to identify high-priority agriculture research topics, i.e. those

which promise payoff from modest investments to overcome specific constraints in IARC programs. The GRC prioritizes these topics, and CSRS invites preproposals on a reasonable number of topics. Peer panels selected by CSRS recommend to the GRC those which should be invited to submit full proposals. The GRC acts on the recommendations and the CSRS asks those approved by the GRC to develop full proposals. The peer panels review the full proposals and submit recommendations to the GRC. The GRC recommends to AID a prioritized list of projects and candidates for grant awards. Centers get the chance to review projects only at the pre-proposal stage. Their comments are taken into consideration for the the request for full proposals.

After receiving concurrence from the Director of the Office of Agriculture of the A.I.D. Bureau for Science & Technology, CSRS awards the grants. CSRS oversees the implementation and reporting processes in conformance with its granting authorities and practices.

SECTION 3 Overall Project Evaluation

3.1 Overall Project Observations

The team is most favorably disposed, as were most people with whom we talked, to the basic concept of the project--that is, the contributions that U.S. agricultural scientists can make in support of IARC programs and the mutual benefits that result. The constraints identified by the IARCs are real and there has generally been a good match between the constraint and the U.S. resources identified to assist in solving the problem. Where sub-projects had progressed far enough to permit an assessment, we were pleased to observe the apparent building and/or strengthening of the linkages between the U.S. and counterpart IARC scientists and institutions. In fact, some linkage building has gone well beyond the bounds of the direct sub-project linkages, extending both horizontally and vertically within and among both the U.S. institutions and the IARC. In one instance, techniques developed by a U.S. laboratory are in use by scientists at three IARCs and will surely be transferred to advanced developing country programs as well as interested U.S. technical programs. In other cases, the sub-projects have stimulated collaboration among U.S. scientists to cooperate in and/or extend the research done within the sub-project. We are certain that many other examples of networking have emerged but time did not permit a full assessment.

We are much less sanguine about the fiscal and management aspects of the project. The level of funding has been reduced to only a fraction of what was originally planned (\$2 to \$2.5 million per year) and to substantially half of that projected in the approved project (\$1 million per year). Changes in PASA policies have added to the complexity of management and extended the paper burden and time frames considerably. These factors as well as the minimal available funds for the project have caused distress in many quarters.

3.2 The Contractor

The use of CSRS experience and capacity as the project implementation mode was deliberately designed into the project concept. This mechanism had been used in other projects within S&T/Agr and had been technically and highly efficient in terms of overheads. Processes and mechanisms for project selection, funding, management, documentation and accounting were well established for in-house small grants programs. Perceived mutual interests permitted minimizing the overhead allowance.

About the time the project was implemented, changes were made in the management of PASAs in USDA. The upshot was a substantial increase in the complexity of negotiations, management and reporting processes and an increase in overhead

recovery by USDA from about 12 percent to 26 percent with a further additional 7 percent (to 33 percent) negotiated for FY 1989. This additional overhead burden has significantly reduced the funds for direct research support.

The shortage of funds notwithstanding, we judge that the technical performance of OICD and CSRS has been excellent. Terms of the PASA have been met both in letter and spirit. Not surprisingly some confusion existed in the start-up phase in constraints and pre-proposal solicitation. But no serious problems have occurred during the last three years. Processes for technical, fiscal and management reporting are well institutionalized and functional. Concern was expressed about the lead time and specificity required for travel approvals but we judge those problems have not been too serious. Likewise, progress reporting has on occasion been tardy, requiring special follow-up attention by CSRS and its contract employee at Colorado State University.

3.3 AID Management

Due in part to personnel changes in S&T/Agr, there was considerable confusion in the early phases of implementation. Lack of adequate guidelines, some confusion in communications with IARCs, late contract arrangements with OICD/CSRS, and drastic funding reductions led to unmet expectations and consternation in several quarters. More recently, the project officer and others in AID have improved communication channels and problems have been handled expeditiously. Funding uncertainties have also been a problem, limiting ability to move ahead with confidence in dealing with the contractor and the IARCs.

Nonetheless, the project manager has satisfactorily handled the solicitation of constraints; organization of the PRC; screening of constraints, pre-proposals and full proposals; and expediting of necessary paperwork.

3.4 Identification, Selection and Use of Sub-Contractors and Consultants

The PASA between USAID and USDA placed responsibility on the latter agency to carry out a selection process "in accordance with participating procedures and, to the maximum extent practicable, under competitive procedures." By teaming with the CSRS as the action agency for this program, several important capabilities were utilized, including access to agricultural research institutions and their scientists in all of the states and territories, many of which have been long-term clients of CSRS; and successful experience with program and program support procedures and operations for other competitive grant programs.

By emphasizing "competitive procedures" the PASA recognized the value of competition utilized widely by other Federal research granting agencies to solicit and choose research proposals. We firmly believe that this assumption was doubly valid for this initial phase of a new research program to (1) bring its merits and needs to the attention of many scientists and (2) to identify quality proposals from those scientists that can best help the IARCs overcome some of their most important research constraints.

The most important evaluation measures of this program are scientific quality and the relevance of research progress and outcomes to help IARCs overcome research constraints. Our assessment primarily documents such progress. We have also described spin-off values both to the IARCs and contributory U.S. research institutions and we have identified ways that various projects are directly or indirectly enhancing segments of American agriculture.

The competitive grant process requires high transactional costs made up mostly of federal and university indirect costs and unreimbursed personnel time. Overhead rates for federal grants at public and private institutions where grants under this program could be awarded have been determined in advance by a federal cognizant agency through negotiations with each of those institutions. Some costs are not billed to these projects, i.e. time of scientists who review preproposals and full proposals by mail or as review panel members. Other federal grants and contract processes also recognize legitimate overhead costs incurred by non-federal cooperating institutions. Therefore, those costs would remain about the same for this program, regardless of the award system used.

Therefore, we contend that the primary basis for determining which federal solicitation and award process be used should be on quality and relevance of the funded proposals. A coupled question might be: Does the value of the outputs significantly exceed the costs of the input? The procedures and process that were used were very appropriate to this first-cycle program. If this program is to be continued we would encourage identification of ways that third-party involvements could be reduced in terms of both human and fiscal resources.

We contend further that the costs and benefits of the research should be estimated or measured within the funds made available for research, i.e. exclusive of overhead costs. Third-party costs (mostly federal and university overhead costs) are necessary cost items but alternatives may be devised that can reduce transactional costs somewhat thus leaving a higher proportion of an appropriation for direct support of research.

SECTION 4 Other Considerations

4.1 Relation to Other AID Funded Research

We noted a number of AID-supported activities to which this project relates in one way or another. There is, of course, the IARC core funding to which this project provides direct support. Some of the CRSPs deal with commodities and/or technologies of common interest to this project. The small grants programs of AID/SCI and S&T/RUR have some similarities in process and/or concept with this program, as do some other centrally-funded projects, including activities in small grains, biotechnology, and plant tissue culture, and the IBSNAT Project.

We did not detect evidence of significant duplication or conflict among these activities. Given the narrow focus of this project on specific constraints identified by IARCs, the chances of such problems are remote. It is quite clear that the three centrally-funded small grants activities are well aware of each others concepts and general activities although no formal cross-monitoring or review process is in place. We do not suggest a need for a formal mechanism.

4.2 Alternate Funding Sources

Suggestions were made that alternative funding sources be identified, for example earmarking a portion of AID's core contribution to IARCs, leveraging funds of other donors, buy-ins by missions, or funding from other U.S. sources, i.e. USDA, private industry or foundations.

We do not think it wise to consider an earmark of core IARC funds. If the U.S. were to move in that direction, we would predict rapid movement of others in that same direction. The ultimate result would be an essentially total direction of programs by donors, an outcome far from the premise upon which the centers, as international organizations, were founded.

Although there may be other potential funding sources, we do not think it likely that other donors, AID missions, U.S. industries or foundations could be attracted. We were unable to satisfactorily assess those possibilities in the time available.

4.3 Project Extension and Funding Levels

The team strongly recommends continuation of the activity within the framework described elsewhere. The benefits, in our view, far outweigh even the high transactional costs of the current process. We would hope to see significant enhancement of the total level of funding, given the obvious large numbers of constraints existent at the IARCs and opportunities for mutually beneficial collaboration and linkage building.

In terms of sub-project funding levels, we fully appreciate the reasons for the mid-stream reduction from \$150,000 to \$90,000 per grant. However, we think that more flexibility in the minimum level is warranted. Some types of research are more costly than others. Some constraints of IARCs are more resource intensive than others. And the variation in overhead rates among the potential participating universities may penalize scientists from those with higher rates. On occasion this might rule out participation of the best performers against a given constraint. A more equitable process might be to place an upper limit on direct costs and let the overhead, and thus the bottom line, fall where it will. Equity would not appear to be served by the actions of one federal agency (the cognizant audit agency) preventing an institution or a scientist from participating in activities of another federal agency.

4.4 S&T/Agr Project Selection Criteria and Section 103 Guidance

We have presented in Annex G a response to S&T/Agr Project selection criteria, the aggregate of which also responds to the more general section 103 guidance statement. Given the rather narrowly targeted and generally fundamental nature of the research performed through this project, it is difficult to draw a direct connection to many of the inferred direct applications in LDCs. However, since the research is deliberately designed to help IARCs and since IARCs' mandates are aimed mainly at assisting LDCs with food, natural resource and economic development problems, one can make that connection, albeit in an indirect rather than direct line.

In sum, and as elaborated elsewhere, we are quite satisfied with both the relevance and the quality of project outputs.

4.5 Perceptions of Program Participants

In addition to information we gathered which was specific to individual projects, we developed some conclusions that extend to participating scientists at the universities and IARCs we visited and to administrative spokesmen for their parent institutions.

Our exposures to people and their programs were brief. To better document the perceptions and reactions of those with whom we met, we are including verbatim summary statements from some of them. We have identified the statements in the sections below and referenced their location in Annex F.

- A. IARC Scientists The proposals for funding clearly reflected the importance and context of the need for scientific inputs required to alleviate the constraints. IARC scientists actively interacted with

the U.S. participant with enthusiasm and full understanding well beyond the formal annual reports.

For example, at CIMMYT the research leader on Triticale improvement could articulate whatever cytological and genetic information that was needed to further improve Triticale at any level of scientific sophistication. Therefore, he could be very precise in suggesting to the ARS scientists at the University of Missouri what chromosomal and genetic adjustments are needed. With regard to the Triticale constraint, the limitation at CIMMYT is in a dimension of laboratory sophistication, direct access to a range of chromosomally adjusted materials, and in experience with complexities of certain means for effecting desired chromosomal rearrangements. None of those limitations extended to the scientific expertise of CIMMYT researchers per se.

Though our exposures to the IARC scientists were brief, we believe a number of them could be successful doing only disciplinary research to obtain new scientific knowledge. However, those we interviewed seemed enthusiastic about their roles and took pride in the value of their research outputs to developing countries.

Dr. J. Crossa's statement on the Sub-Project Evaluation, Management, and Utilization of Maize Germplasm and Breeding Systems (CIMMYT) is reproduced in Annex F.

- B. Parent IARCs Our on-site perceptions were essentially limited to CIMMYT. There, we found that the Director-General and the program leaders saw high values accruing from collaboration between scientists at U.S. universities and at CIMMYT, including those supported by the special constraints program.

Dr. Ronald Cantrell, Corn Program leader has provided a statement summarizing his analysis of CIMMYT's participation in the Special Constraints Project (Annex F). Dr. Donald Winkelmann, Director-General, expressed similar support.

In order to expand the input of the IARCs into our evaluation, we invited Directors General of participating Centers that we were not able to visit to provide comments on several topics (see Annex D). Responses from the Centers are reproduced in Annex E.

It is quite clear that the Centers are very favorable to the concept of this project, and that they would like to expand and reinforce linkage with U.S. scientific resources. They judged the ongoing collaboration both within and outside this project to be most helpful to their programs. It is equally clear that they think the project is greatly underfunded, thereby missing a great many potentially productive opportunities. Finally, they lament what they perceive as an unduly cumbersome, costly and protracted process for such a small number of grants funded, even though these procedures do not affect center costs.

- C. University Scientists We have been impressed with the caliber and productivity of scientists at U.S. universities attracted to the Special Constraints Research Program. Four of the research leaders we interviewed occupy endowed Chairs as Distinguished Professors; Dr. C.O. Gardner, Nebraska, Dr. Steven Slack, Cornell, Dr. J.T. Ritchie, Michigan State, and Dr. John Axtell, Purdue. Dr. Axtell is also a member of the National Academy of Sciences. Others are full professors, for the most part, and they are highly experienced leaders in their specialty fields.

In the search for research relevant to IARC constraints, the system chose scientists of very high quality. For the projects which have matured sufficiently to show results, promise and potential of the scientists selected has been effectively realized. We have listed specifics elsewhere in the report.

We have included in Annex F statements provided to us by Dr. Roger Lawson, Agricultural Research Service, Beltsville, MD (plant viruses), Dr. R.M. Lister (barley viruses) and Dr. John Axtell (forage sorghum digestibility), Purdue University, Dr. Steven Slack (potato and sweet potato viruses) and Dr. Robert Plaisted (insect resistance-potatoes) Cornell University. The statements contain perspectives of the scientists on their research progress and the actual and potential impacts on agricultural progress in Third World countries and in the U.S.

- D. Parent Universities We discussed the Special Constraints Project with college of agriculture administrators at three cooperating universities, the University of Nebraska, Cornell University and Purdue University. They were pleased to have scientists from their universities participate in the Project, and they were glad (but not surprised) that those scientists were

making important and directly usable contributions. Administratively, the Project had their full support.

They also expressed their opinion in larger terms. As Dean Robert L. Thompson, School of Agriculture, Purdue University stated it--"These collaborative research endeavors help our scientists, students and the American agricultural community at large acquire 'global intelligence.'" (His entire brief statement is in Annex F.) Dean David Call, College of Agriculture, Cornell University and his associates expressed similar views as did Experiment Station Director Darrell Nelson at the University of Nebraska.

4.6 Interdependence Among Research Institutions

Our collective experience reinforced through this evaluation suggests strongly that interdependence among agricultural research institutions will increase. The frontiers of scientific disciplinary fields important to agriculture are expanding at increasing rates and the sophistication of research needed to capture and transform those advances to meet the needs of agriculture make it increasingly difficult for a single research institution to remain self-sufficient. The trend is then to utilize the most advanced expertise wherever it may be by associating it with an in-house program need. In that vein, we believe the IARCs will accelerate best their own research progress by using more leading expertise at universities.

SECTION 5 Assessment of Sub-Projects

5.1 Review Process

Research has begun on all of the sub-projects and initial information we have received is encouraging. However, formal progress reports did not come in for 1988 and 1989 sub-projects before our overall review of the Special Constraints Program was made.

Appraisals were made of all of the projects funded in fiscal years 1986-89 inclusive. 1985 funds were conjoined with FY 1986 funds to support FY 1986 projects.

Progress reports and outlines were reviewed for 1986 and 1987. Project outlines were reviewed for the later projects. Seven projects were reviewed with research project personnel. Five projects were commented on by CIMMYT scientists. The above included two projects which were discussed by the university scientists and separately by CIMMYT scientists.

In the following subsections, projects funded in each program cycle are listed in the priority order or rank determined through the Peer Panel and Project Recommendation Committee process. In addition to rank, title, IARC and U.S. research cooperation, projects are discussed under the following topics:

Quality The first prerequisite of any project is scientific quality. Without good quality the outcome will be without much value.

Relevance In this program, the research done in U.S. laboratories must serve the needs of the constraint articulated in advance by the respective IARCs. We have tried to identify the main relevancies for each project. Some secondary values to the centers are noted.

Reciprocity We tried to capture and report primary and secondary values accruing back to U.S. interests. Some results had direct or potential values to U.S. agriculture (development of corn genetic composites released to U.S. corn breeders that contained pest resistances from tropical and sub-tropical origins; virus identification procedures that are being used by U.S. plant quarantine agencies, crop models usable in the U.S. etc.). The secondary values tended to be new or improved scientific techniques with broad applications, suggestions and ideas flowing from IARC scientists to U.S. counterparts, and a broadening of perspectives of U.S. scientists by their participation in agricultural activities exotic to the U.S.

Progress This section was used only if we had firm verbal and/or written assurance of important findings and accomplishments.

5.2 FY 1986 Funded Sub-Projects

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
1	Evaluation, management, and utilization of maize germplasm and breeding systems	CIMMYT	University of Nebraska C.O. Gardner Blaine Johnson Thomas Compton W.A. Compton

Quality Dr. Gardner and his associates are national and international leaders in quantitative genetics in corn. Dr. Ron Cantrell and his associates at CIMMYT assured us of the quality and usefulness of the Nebraska inputs.

Relevance Nebraska data has shown the substantial limitations in CIMMYT composites for selection for hybrid vigor. (The genetically broad-based composites were formulated to insure adaptability to broad ecological bands or areas where little was known about soil, climate and pest factors). Early testing of partially refined hybrids developed at CIMMYT have shown about a 15% yield advantage over the composites and U.S. hybrids in the lowland tropics of Mexico.

Reciprocity Nebraska is releasing an exotic germ plasm composite developed from CIMMYT materials to the U.S. corn breeding industry. Four more composites from similar genetic backgrounds are nearing release. This is a remarkable example of direct value to U.S. corn improvement coming from a foreign assistance project!

Results Bases have been established for more effective gene pool testing and for developing new gene pools with more heterotic (hybrid vigor) potential. A seed industry in developing countries probably will be needed to insure practical exploitation of ultimately superior corn hybrids and to develop a monetarily efficient delivery system of genetically improved seeds to farmers.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
2	The urgent requirement by IITA for a taxonomic resolution of <u>Cylas</u> in Africa	IITA	Rutgers University G.W. Wolfe

Quality The leader has had considerable experience in taxonomic studies of insect species, including use of scanning electron microscopy and computer analysis of phylogenetic data.

Relevance More precise taxonomic information of Cylas is a necessary precursor to optimally target breeding programs to identify and incorporate resistance to the insects that constitute a serious problem in Africa.

Reciprocity The scope and depth of scientific understanding of this group of insect species will become better understood thus broadening such knowledge for U.S. scientists and others.

Results Fieldwork in Namibia, Botswana and South Africa combined with laboratory work at Rutgers University and IITA has resulted in several gains in taxonomic understanding. They include:

1. Cylas and Protocylas are one genus
2. Seven species groups were identified in Cylas. Pest species are limited to C. formicarius and C. puncticollis.
3. As many as eight individual species may show significant pest harmfulness.
4. Data is being subjected to computer analysis.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
3	Chemotherapy and thermo-therapy in <u>in vitro</u> potato and sweet potato plantlets.	CIP	University of Wisconsin, Transferred to Cornell University S.A. Slack

Quality Dr. Slack has moved from the University of Wisconsin to Cornell University. We reviewed the research underway at Cornell, and we were impressed with the quality and enthusiasm of the research participation and the sophistication of the facilities and equipment used for the project.

Relevance 47 clones from CIP have been categorized and viruses in them were identified through a virazole culture system. CIP is using the protocols developed by Dr. Slack and is using in vitro plantlets for production of pathogen-tested stock plantlets.

Reciprocity Techniques developed to produce virus-free potato stocks will also have much value to potato breeders in the U.S.

Results In addition to results reported under Relevance it was found that virus-free plantlets could be obtained from nodal cuttings in a much shorter time than from meristem tips. Both kinds of plantlets were subjected to chemical x thermal treatments which varied somewhat for different genetic lines.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
4	Monoclonal antibodies and cloned cDNA to index for sweet potato and yam viruses.	IITA	USDA/ARS Beltsville R.H. Lawson J. Hammond

Quality Drs. Lawson and Hammond are well equipped in research capability and in facilities and equipment for this work.

Relevance An antibody, Mab PTY 1, was developed that could detect several major viruses affecting sweet potatoes. Two monoclonal antibodies have been supplied to CIP as well as IITA for use in the virus testing program. A post-doctoral scientist based at CIP visited USDA-ARS to prepare complementary DNA to two potato and one sweet potato virus.

Reciprocity Some of the reagents produced or used in this study have also been used to aid the U.S. National Plant Germplasm Quarantine Laboratory to screen sweet potato germplasm for viruses and to prevent introduction of virus-infected material.

Results In addition to results identified above, monoclonal antibodies have been developed for virus indexing and other for mycoplasma-like organisms infecting sweet potatoes.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
5	Development of a barley yield simulation model.	ICARDA/ IFDC	Michigan State University J.T. Ritchie D. Godwin B. Johnson S. Otter-Nacke

Quality Dr. Ritchie has had a rich and productive experience with crop modeling, its components, and in factoring their interactions. His familiarity with corn and wheat models reduced the cost of developing a barley model to 10 to 15% of the cost of hiring an equally talented scientist who would have had to begin developing a barley model from scratch. Models for legume seed crops and root crops can be developed with comparable savings.

Relevance The barley model, nearing completion, provides a framework in which to integrate ecological and crop data into an analyzable and composite system. Further, the model's needs for

forms of data provide guidance to individual field experiments that can simultaneously improve the model and fulfill individualistic objectives of the experiments.

Reciprocity The modeling concept unites existing and prospective data into a system of information for a crop whose uses are not limited to developing countries. Increasing computer capabilities combined with new advanced quantitative analyses of masses of complex data has many uses for understanding commodity changes and needs in the U.S. Further, crop models provide a sounder basis for the U.S. to make world yield projections.

Results The barley model is about completed. It deviates only about 15 percent from the wheat model because of many performance similarities between the two crops. In addition to agronomic and predictive values, crop models are assisting governments in the developing countries to formulate policies more precisely supportive of crop production, purchased input needs, seed distribution, harvesting and assembling of farm surpluses for domestic consumption and/or foreign trade.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
6	Differentiating the corn stunt and bushy stunt of Latin America.	CIMMYT	Ohio State University D.T. Gordon R.E. Gingery R.A. Simkins

Quality The group at the Ohio Agricultural Research and Development Center (OARDC), Ohio State University, is one of the top corn virus research teams in the U.S. from the standpoints of scientific expertise and experience and facilities and equipment.

Relevance CIMMYT scientists recognized that visual identification of causal viruses, mycoplasma, etc. were substantially inadequate making searches for resistance to specific viruses almost meaningless. The OARDC research group is developing serological identification procedures to separate corn stunt spiroplasma, maize bushy stunt mycoplasma and maize rayado fino virus, all of which seriously reduce corn yields in Central and South America.

Reciprocity Experience with a wider range of corn viruses will enable OARDC scientists to cope with indigenous viruses and with exotic viruses should they invade U.S. corn production areas.

Results A highly sensitive ELISA test was developed for identifying corn stunt spiroplasma using a polyclonal antiserum developed at OARDC. This test is now available to CIMMYT. A polyclonal antiserum to identify maize bushy stunt mycoplasma has

also been developed. The latter proved to be the most prevalent of the three viruses in field tests in three central American countries.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
7	Reproductive Biology of <u>Striga hermonthica</u>	ICRISAT	Old Dominion University L.J. Musselman Barathalakshmi D.A. Knepper

Quality The project leader is a leading U.S. expert on Striga spp. Because giant witchweed, S. hermonthica is not present in the U.S., strict quarantine requirements prevent any research in the U.S. on live plants. Consequently, direct expertise in the U.S. on that parasitic weed is limited. Dr. Musselman has considerable foreign research experience, and he has laboratory capabilities to analyze plant parts for genetic differences and host plant specificity of Striga spp. A U.S. wide search for proposals paid off by locating Dr. Musselman, particularly because he is at a University that rarely participates in agricultural research.

Relevance Striga hermonthica is a very serious parasitic weed reducing yields of sorghum and millet particularly. Knowledge of its growth and reproductive characteristics will permit scientists to devise interceptive methods for its control.

Reciprocity Some of the knowledge obtained may lead to more effective control of common witchweed in the U.S.

Results S. hermonthica is an obligate outcrosser while S. forbesii, also important in Africa, is mostly self-pollinated. Enzyme analyses are being used to characterize metabolic variations between and within Striga spp.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
8	Removing soil structural constraints to the production of maize and legumes following rice.	IRRI	University of Minnesota W.E. Larson S.C. Gupta

Quality Dr. Larson is recognized as a national leader in his field of expertise. He and Dr. Gupta are fully qualified to carry out this research. The results obtained so far bear out our appraisal.

Relevance In addition to providing data on structural constraints in puddled rice soils and solutions to the problem, methodology and equipment designed for the experiment are now in use at IRRI for continuing research on the problem. Techniques developed have also been presented through IRRI to participants from Indonesia, Philippines and Thailand.

Reciprocity A portable automatic frictionless micro penetrometer was developed to measure soil resistance to emerging seedlings. This equipment can be used throughout the U.S. for field measurements of crust and aggregate strength.

Results Equipment and procedures were developed to improve mungbean seedling emergence following rice. Variations in soil moisture conditions were accounted for in developing procedures to maximize mungbean emergence.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
9	Evaluation of wild perennial <u>Glycine</u> accessions for resistance to <u>Phakopsora pachyrhizi</u> Syd.	AVRDC	University of Illinois T. Hymowitz A.T. Tschantz (now with USDA-APHIS)

Quality The soybean collection of germplasm at Illinois is probably the most comprehensive in the world, and Dr. Hymowitz is highly capable of identifying and utilizing germ plasm for the purpose of this project. The budget asking was reduced from \$150,000 to \$50,000 because it was not certain at the time of project awards whether resistance to soybean rust could be located in the wild perennial Glycine germ plasm. This has reduced the progress of this work.

Relevance Soybean rust is a serious menace of soybeans in the tropics and sub-tropics of Asia. AVRDC will continue their involvement in the project after they have recruited a plant pathologist to replace Dr. Tschantz.

Reciprocity the presence of soybean rust has not been reported in the southern United States. This project will build information as well as identify sources of resistance should it invade that area. Ecological characteristics of soybean growing areas in the southern U.S. suggest receptivity should the fungus gain a foothold.

Results Promising sources of resistance were found in seven wild species of Glycine. Incorporation of these sources of resistance into domestic soybeans will wait until replacement of Dr. Tschantz is on board at AVRDC.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
10	Development of maize composite resistant to several major insect pests.	CIMMYT	Cornell University V.E. Gracen

This project was funded from a source other than project 936-4136 funds but was selected on a competitive basis. The leader has moved to a position in industry. The reaction from corn research leaders at CIMMYT was favorable to the inputs from this modestly funded (\$20,000) project. The composite developed did contain some useful resistance to serious insect pests. The research is continuing under the direction of another Cornell scientist cooperating with scientists at Mississippi and Georgia.

5.3 FY 1987 Funded Sub-Projects

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
1	Introduction of chromosomes and their segments from the D-genome of breadwheat into hexaploid Triticale.	CIMMYT	Agricultural Research Service at University of Missouri J.P. Gustafson A.J. Lukaszewski

Quality The group at the University of Missouri is considered to be the best in world in making chromosome substitutions in wheat, in selecting genetic sources for substitutions and in characterizing and evaluating results.

Relevance Triticale replaces wheat only where it has production advantage. It often has a 2:1 yield gain over improved bread wheats on very acid soils such as in the lower ranges of the Himalayas, highlands of East Africa and the campos arrados of Brazil. Triticale lacks good baking quality. Many of the genes controlling good baking and milling quality in wheat reside in the D-genome. Transfer of the D-genome to triticale with subsequent genetic refinements promises a high probability for quality improvement. The scientists at CIMMYT, in our opinion, are fully capable of capitalizing on the breakthrough.

Reciprocity U.S. wheat improvement has benefitted from many foreign sources of improvement in the past. As CIMMYT and the many countries it serves make progress, including CIMMYT's comprehensive collection of wheat germ plasm, U.S. wheat breeders, public and private can and will benefit proportionately.

Progress The set of single substitutions (D for A and D for B) in backcrosses to Rhino triticale is complete. Substitutions of Grana chromosomes for those originating from a German wheat and from Chinese Spring wheat are still to be made. Other substitutions and refinements are well along including genetic characterizations of substituted chromosomes and chromosome segments.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
2	Bacterial Leaf Blight of Rice: Serological and Epidemiological Studies	IRRI	University of Hawaii Anne M. Alvarez Alfred Benedict

Quality The project leaders have been prolific researchers in the field of serology and epidemiology of a number of tropical and temperate plant species, and they had preliminary results relevant to this project at its inception. They are fully familiar with the comprehensive research done elsewhere on bacterial blight of rice.

Relevance Collaboration of two plant pathologists having international experience with bacterial blight and in quantitative epidemiology insures greater relevance to IRRI needs. IRRI researchers are fully capable of transferring the technology and knowledge gained to researchers in rice growing countries of the tropics.

Reciprocity U.S. is interested in improvement and sustainability of rice yields in developing countries thus helping them to provide food for their people. Progress under this sub-project helps to serve that purpose. U.S. scientists who are working similarly are apt to benefit from scientific successes of the project.

Progress The presence of the bacterial blight pathogen in rice plants can now be monitored by artificially cultured rice leaves and seeds followed by ELISA using a panel of monoclonal antibodies.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
3	Use of plant transformation technique to modify the quality of Cassava (<u>Manihot esculenta</u>)	CIAT	Louisiana State University Jesse Jaynes

Quality The project leader has a strong background in cyto-chemistry and related plant biochemistry with research experience appropriate to this project. Laboratory facilities are more than

adequate. The researcher has been successful in introducing high protein constructs into potatoes and sweet potatoes.

Relevances CIAT's Cassava program will be enhanced through introduction of synthetic genes for essential amino acid encoding to improve protein quality.

Reciprocity Though not a major food crop in the U.S., high protein cassava will be valuable in Puerto Rico and tropical U.S. islands in the Pacific. Involvement in this effort will widen the experience and further refine the techniques involved in this approach to protein enhancement in other food crops in the U.S.

Progress The project leader has regenerated plants which are kanamycin resistant and which are presumed to contain the gene for amino-enhanced protein. These plants are being tested to confirm the presence of the gene. Subsequent tests will verify activity of the gene and the stability of the protein product.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
4	Introduction of pest resistance into mungbean (<u>Vigna radiata</u>) via unconventional gene transfer.	AVRDC	Oregon State University David Mok Machteld Mok

Quality This husband and wife team have had a short, but productive, research experience of the kind highly supportive of this kind of project. Laboratory equipment for this kind of research is modern and fully adequate. A related wild species of mungbean, Vigna grabescens, was found in 1984 that had a high level of resistance to bean flies and leafspot, serious pests of the common mungbean. The leaders are in the process of transferring gene(s) for that resistance.

Relevance The project was designed in collaboration with AVRDC. The wild resistant line was obtained there, and Ms. H.K. Chen, mung breeder at AVRDC for the past five years, is being supported by this grant to pursue a doctoral degree at Oregon State University. The methodologies of gene transfer used in the project will subsequently be available to AVRDC through the return of Ms. Chen.

Reciprocity The main value to the U.S. will probably be in research process enhancement in making difficult wide crosses between crop species and wild plant relatives.

Progress Interspecific hybrids between the wild Vigna relative and common mungbean have been obtained using embryo rescue and adventitious embryony in tissue culture. Backcrosses to mungbean cultivars to achieve gene transfer are in progress.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
5	Characterization of barley yellow dwarf viruses in Africa and Latin America	CIMMYT	Purdue University Richard Lister Bryan Larkins David Asai Gregory Webby Peter Burnett (CIMMYT)

Quality We visited the virology laboratories and discussed this project with the scientists. All are excellent. They have developed a complete collection of polyclonal and monoclonal antisera to identify and type isolates of barley yellow dwarf viruses. They can utilize dried leaf material as well as fresh thus facilitating more comprehensively the obtaining of samples, particularly from countries where they have difficulty in transmitting fresh materials.

Relevance We also discussed the project with Dr. Peter Burnett at CIMMYT who has utilized some of the typing and characterization results from Purdue tests to focus his barley breeding research in more precise directions for resistance. Dr. Lister has visited CIMMYT and worked out mutualities with Dr. Burnett.

Reciprocity This project will enable Purdue scientists to broaden their program to world-wide dimensions. Some of the results will surely result in identifying sources of virus resistance that can be incorporated in U.S. barley cultivars. Visual symptoms alone have proved to be inadequate.

Progress The collection of isolate-specific barley yellow dwarf virus antisera has been extended. An indirect ELISA showing promises as a test for several virus serotypes has been developed.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
6	Selection and evaluation of African clover species for growth, seed production, and biological nitrogen fixation under drought stress.	ILCA	Virginia Tech University C. Hagedorn S.W. Van Scoyoc

Quality Dr. Hagedorn has had ten years of experience in research on annual clovers in the Pacific northwest and in the South-eastern U.S., and he has participated in the annual clover evaluations program in Australia. Facilities and equipment are adequate for the proposal research.

Relevance The proposal was developed in close collaboration with Dr. John Lazier, ILCA, who emphasized the need for more effective inoculants for nitrogen fixation especially for periods of moisture stress on the clover plants.

Reciprocity The value to the U.S. will probably be limited to refining techniques for evaluating strains of symbiotic N-fixing strains of bacteria. The value to Africa is more direct and comprehensive through improvements in yields of annual clovers important to livestock production in that country.

Results Evaluation of productivity of 31 accessions of five species of clover have been completed and they are being evaluated in conjunction with 35 strains of nitrogen fixing bacteria. African soil samples are being analyzed for presence of additional strains which may be used.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
7	Facilitating the development of resistance to the sweet potato weevil.	IITA	University of Georgia S.J. Kays S.K. Hahn R.F. Severson S. Nottingham

Quality The participating researchers include scientists from the University of Georgia and IITA who collectively provide expertise and experience needed for the project. Facilities and equipment are adequate for the project.

Relevance The project has been developed jointly by scientists at the two locations (Georgia and IITA). Joint participation will more effectively facilitate transfer of research results into IITA sweet potato research and from there to African countries where sweet potatoes are grown.

Reciprocity Biochemical insect interactions identified which affect ovipositing preference and antibiosis factors will be valuable to further improvement of insect resistance in sweet potatoes in other sweet potato producing areas including the U.S.

Progress Bioassays for oviposition and leaf feeding have been developed and are being tested. Differences in dual-choice feeding were noted between a susceptible sweet potato line and one that is moderately resistant to the weevil.

5.4 FY 1988 Funded Sub-Projects

Research has begun on all of the projects and initial information we have received is encouraging. However, formal progress reports have not come in before our overall review of the Special Research Constraints Program has been made.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
1	Identification, Characterization and Detection of Sweet Potato Viruses	CIP	North Carolina Agricultural Research Service James Moyer

Quality U.S. researchers have outstanding expertise on viruses unique to the sweet potato especially with the sweet potato vein mottle virus (SPVMV). Work has begun to purify other viruses and develop antiserums to compare and differentiate among them. Subsequently, reliable biochemical assays will be developed to process large numbers of sweet potato accessions.

Relevance CIP has about 1700 Ipomea accessions, probably the largest in existence. CIP needs the information and techniques from this project to distribute pathogen-tested genetic materials from that collection similar to what they can now do with their potato accessions.

Mutuality CIP's experience with potatoes will enhance progress on sweet potato viruses. Gains from this project will contribute directly and indirectly to reducing viral losses on those crops in temperate (including U.S.) as well as more tropical areas.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
2	Development of field-useful techniques for identification and enumeration of inoculant strains of <u>Rhizobium</u> for chickpea and pigeon pea.	ICRISAT	North Carolina Agricultural Research Service Dr. Gerald Elkan

Quality Dr. Elkan has had 30 years of successful experience in all aspects of symbiotic nitrogen fixation. He collaborated with ICRISAT for six years supplying the groundnut program with promising nitrogen-fixing isolates and promising cultivars for optimizing biological nitrogen fixation. Dr. Elkan has available first-class equipment, controlled climate chambers and experienced technician help.

Relevance This program will bolster a program at ICRISAT to improve symbiotic nitrogen fixation by Rhizobium spp. on two mandated crops, chickpea and pigeon pea, primarily to reduce costs for nitrogen fertilizers to low income farmers.

Mutuality ICRISAT has identified efficient Rhizobium inoculant strains. The research under this project is intended to improve their usefulness under field conditions.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
3	Phenolic Compounds and Microbial Degradation of Stover from Diverse Sorghum Lines	ILCA	Purdue Research Foundation John Patterson Jerome Cherney John Axtell

Quality Dr. J.D. Reed, ILCA, already has a well developed research program to improve utilization of forage stover. The Purdue scientists, with access to the World Sorghum Collection at Purdue, and buttressed with superior research facilities and equipment will enhance the important efforts of Dr. Reed. Further, by analyzing a wider array of germplasm, the application spectrum will be enlarged. Additional understanding of fundamental processes in forage digestion are likely to accrue.

Relevance The Purdue research is a direct extension of current research at ILCA utilizing latest analytical techniques and a wider array of sorghum germplasm.

Mutuality Utilizing results of this work over time can lead to gains of ten percent or more in nutritive value through introduction of genetically selected stover strains. Compared to present production levels, that would be gains equivalent to the addition of about 17 million tons of stover without changing current farming practices. This work will also help to improve animal utilization of forage sorghums in the U.S.

Review of Project The identification of "tan" lines of sorghum with low levels of phenolic compounds and significant improvement in animal digestibility have high promise for forage sorghum improvement in the U.S.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
4	Incorporation of Resistance to Pod Borer and Pod Bugs into Cowpea	IITA	Purdue University R.A. Bressan L.W. Kitch R.E. Shade L.L. Murdock

Quality The project members are also members of a continuing research team under the title, Research Initiative: Insects of

.42

Stored Pulses, RIISP, formally organized in 1984 to seek resistance to bruchid beetles in cowpea and the common bean for the benefit of low resource farmers in developing countries. Drs. Hasegawa and Bressan are experts on cell and tissue culture and interspecific hybridization approaches. Kitch is a cowpea breeder-geneticist. Shade and Murdock are entomologists. They all are backed with excellent laboratory and greenhouse space and equipment. Their success in rescuing immature hybrid embryos in other wide legume crosses augers well for this project.

Relevance This research is complementary to the Bean/Cowpea CRSP Camaroon project which focuses on post-harvest preservation of cowpea. Resistance will significantly enhance cowpea production most importantly in Africa where 70% of the world's cowpeas are grown. The Purdue scientists will provide "cowpea-like germplasm" that can be quickly incorporated into IITA's ongoing breeding program.

Mutuality The main value to the U.S. will be through scientific enhancement of methods needed to facilitate wide crosses in other legume species grown in the U.S. These may include improved viability of immature embryos, interovular transplants and stimulation of adventitious plant formation from cells of immature embryos.

Review of Project A firm start has been made to develop techniques to rescue immature cowpea embryos. A workable growth protocol has been developed to bring immature embryos to the "torpedo" stage from whence further plant development can be realized.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
5	Development of methods for mass screening of rice for tolerance to low soil Zn and P.	IRRI	University of Minnesota Paul Bloom Deborah Allan

Quality U.S. researchers have had substantial research experience in the category of this project. Dr. Bloom has been studying zinc and carbonate chemistry of riceland soils of the Philippines since his sabbatic year at IRRI (1986-87). Both leaders have access to first-rate equipment.

Relevance Screening methods at IRRI do not permit screening of a sufficient number of breeding lines of rice nor do they represent the wide range of rooting environments in low phosphorus and low zinc soils. U.S. research will develop larger scale systems for mass screening for tolerance to low zinc and phosphorus levels. A senior research assistant will be brought to Minnesota for training in the operation of the system when developed.

Mutuality IRRI varieties and germplasm have been utilized to improve rice production in the U.S. especially in California. This research is likely to help the U.S. make further improvements in addition to IRRI contribution to the many developing countries that are dependant on rice for food.

5.5 FY 1989 Funded Sub-Projects

Research has begun on all of the projects and initial information we have received is encouraging. However, formal progress reports have not come in before our overall review of the Special Constraints Program has been made.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
1	Molecular Genetics of Trypanosome Gene Regulation	ILRAD	University of California Nina Agabian

Quality The investigator is experienced and highly productive within the parameter of the project. As Director of the Intercampus Program, Molecular Biology, she has direct access to related expertise this study needs. A carefully chosen post doctoral scientist, Dr. Debra Barnes, will carry out the research.

Relevance The project will augment existing collaborations between the University of California and ILRAD, meaning that initial steps for this project have already been taken. Dr. Barnes has spent two periods of several weeks each at ILRAD, and Dr. Phelix Majiwa of ILRAD is working in the Berkeley laboratories this year. Thus, the work to understand the gene regulation and parasite development of Trypanosome, a devastating scourge of man and his domestic animals in third world countries, is collaboratively underway.

Reciprocity The main value of the success of this and related research to the U.S. is removal of a major impediment to progress in many developing countries. Studies have shown that agricultural and human progress in those countries translates into as much or greater enhancement of trade with the U.S. Equally important is the opportunity of U.S. scientists to make major contributions to reducing or possibly eliminating massive trypanosome damage that so far has eluded the use of vaccines or drugs.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
2	Disrupting Chemical Communication in <u>Striga</u>	ICRISAT	University of Chicago David Lynn

Quality Dr. Lynn has already published two collaborative papers on biochemical bases for germination stimulation and attachment of Striga asiatica haustoria (physical attachments) to host crop plants. His laboratory is well equipped for this research and is a recognized quarantine laboratory. Striga asiatica seeds are being obtained for laboratory germination and study under an existing quarantine licence. (Striga asiatica a parasitic weed attacking primarily sorghum, corn and wheat in Asia and Africa is not known to be present in the U.S.)

Relevance This project will constitute a sophisticated extension of capabilities at ICRISAT. Understanding of the biochemical basis for haustorial seeking and penetration into host crop plants will enable ICRISAT scientists to formulate interception and blockage techniques to substantially reduce the threat of Striga spp.

Reciprocity Success in this effort may well provide leads to develop controls for common witchweed, a parasitic weed causing substantial damage to crops in the Southeast U.S. and for other parasitic weeds as well.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
3	Sheep major histocompatibility system relationship to susceptibility to nematodes	ILCA	Louisiana State University James Miller Michael Stear

Quality Dr. Miller is currently in the third year of a five-year project studying the epidemiology of internal nematode parasitism in sheep under semi-tropical condition in southern Louisiana. He has shown that Louisiana native sheep, apparently through natural selection, survived for years without use of clinical drugs for nematode control. Suffolk sheep have required frequent clinical treatment under the same conditions. The study will identify histocompatibility systems differences. Drs. Miller and Stear (located at the University of Nebraska) are the only scientists in the U.S.A. actively investigating the role of the ovine lymphocyte antigen (OLA) in host resistance to nematode parasitism.

Relevance An ILCA-maintained breed of sheep, Red Masai, will be included in the study. Reagents for over 20 antigens in sheep

are available from Nebraska-Lincoln. Techniques coupled with inheritance studies of cross-bred offspring can identify genes and their heritabilities for future improvement.

Reciprocity Progress will benefit mostly sheep production in the tropics and sub-tropic, but should aid sheep production in the deep South of the U.S.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
4	Cloning of <u>Bacillus thuringiensis</u> gene into <u>Rhizobium</u> to control the Sitona weevil	ICARDA	Washington State University D.F. Bezdicek M.L. Kahn M.A. Quinn (U. of Idaho)

Quality The project leaders have already developed techniques for transfer of cloned genes into bacteria and for evaluating toxicity of sources of B. thuringiensis to Sitona spp. Appropriate laboratory equipment at the two universities (8 miles apart) are currently available.

Relevance Dr. Saxena, ICARDA leader of the Food Legume Improvement Program, reports he and his colleagues have already developed methods for rearing Sitona weevils in intact soil cores. When the U.S. research has transferred toxicity to Sitona into the nitrogen fixing bacteria, ICARDA scientists will become active partners in the subsequent refinement steps.

Reciprocity Sitona spp. are serious insect pests of many legume species in many areas of the world including lentil, pea, clover and faba bean. In the Pacific Northwest of the U.S.A., adult Sitona lineatus can reduce yield of winter peas by 15 to 25 percent if seedling plants are unprotected by chemicals. A biocontrol, the aim of this project, would benefit the U.S.A. as well as developing countries where purchased chemicals are often unavailable and/or high priced especially to subsistence farmers.

<u>Rank</u>	<u>Title</u>	<u>IARC</u>	<u>U.S. Research</u>
5	Yield potential in common bean, (<u>Phaseolus vulgaris</u> L.) genotypes as related to seed size and response to temperature	CIAT	University of Florida Kenneth Boote J.M. Bennett J.W. Jones

Quality The support asking of the original proposal had to be reduced about in half because of lack of available grant funds.

The proposal was downsized by the project leader, and Jeff White of CIAT agreed to assist on making cell size measurements. Within those limitations, the research leaders are well prepared to investigate the physiological-genetic characters limiting the yield potential of large-seeded Phaseolus genotypes in warm climatic regions. Depending on the nature of results, bean and related plant breeders will be able to adjust their selection criteria to achieve higher seed yields.

Relevance The U.S. project leaders have already obtained CIAT collected data through Dr. White to calibrate and validate a model (called BEANGRO) to simulate vegetative growth, reproductive development, and yield of the common bean. The recalibrated model will be used to identify the factors limiting yields under tropical temperature conditions.

Reciprocity Results from this research will enhance understanding of physiological-genetic interactions in large seeded food legumes in this country as in other parts of the world.

5.6 Overall Analysis of the Sub-Projects

A. Agricultural Context of Our Analysis

We believe it is important to analyze the Program of Special Research Constraints against the larger backdrop of the role of agricultural research to advance agriculture and relationships between public investments in agricultural research and public benefits.

The Economic Research Service, U.S. Department of Agriculture, conducted a comprehensive study in which it quantified the relative impacts of major factor inputs on agricultural production and productivity in economic terms since World War II. The study found that about 80 percent of the increases in production and 60-70 percent of the advances in productivity were traceable to agricultural research and related extension. Most of the remainder was due to more effective uses of energy.

A similar study of comparable advances in the Third World countries would likely find research and related extension to be major factors in agricultural production and productivity gains. Our view is buttressed by the impact of the "Green Revolution" wheats from CIMMYT that was recognized by award of the 1970 Nobel Prize for Peace to Dr. Norman Borlaug, the leader of the improvement program. Rice production increases generated through IRRI have had comparable major impacts in rice-consuming countries. Research and development at the other IARCs are producing noteworthy impacts as well. We believe the modestly funded Special Research Constraints sub-projects are already

lessening important research constraints to enable IARC research to continue to help developing countries become more self-sufficient in food and nutrition.

B. Economic Value of Agricultural Research

Several Land-Grant university scientists conducted a comprehensive study of the economic payoffs of agricultural research in the late 1970s. They used an analytical procedure that had been considered valid by the U.S. Office of Management and Budget before the study was activated. Net gains in dollar values to the public exceeded federal and state tax revenue and commercial inputs by 15-25 percent annually after the standard commercial discount rate of 10 percent had been applied. Private companies, including lending institutions, consider prospects for a 15 percent annual return on investment a "go" proposition.

Comparable results for developing countries may or may not be obtained. Less overall requirements for mission supportive basic research may increase the profit figure, but less capabilities for utilizing the research results may reduce net profits. However, as developing countries improve their infrastructures involving agriculture, balance incentives with needs for food, and accumulate expertise in the important components of their agricultural systems, the limitations to economic exploitation of research information will be reduced.

C. Payoffs from Inputs of U.S. Scientists to IARCs

AID has attracted action inputs of university scientists in programs other than the Special Research Constraints Program. The agency intent and understanding in this regard therefore is not at issue. The AID officials we talked to had a thoughtful appreciation for the long-term importance of research to promote agricultural progress in developing countries.

D. The Role of the Special Research Constraints Project

The original purpose of this project, is, in our opinion, being activated through the sub-projects. Where the prospectus of the IARC research constraint could be satisfied in a three-year period, it generally was or will be for those sub-projects still underway. A prospectus that defined a needed benchmark of progress provided equally attainable goals over the same time period. We found a good match between reasonable research prospectuses and actual or prospective meeting of the needs of the constraint so articulated.

The primary evaluation question we could only partially answer is: What is the worth of removing a research constraint? When all of the currently funded sub-projects are completed a more comprehensive and accurate assessment of the answers to that

question can be made. (Please see Annex F for statements on this subject by scientists interviewed.)

One example we feel is noteworthy is corn improvement. Genetically broad based CIMMYT composites showed low potential for heterosis (hybrid vigor) so lines more suited to use in formulating hybrids are being examined. Four Nebraska formulated composites utilizing CIMMYT germplasm are being released to U.S. corn breeders in Nebraska.

Serological identification of viruses Protocols for virus and mycoplasma identification permit more accurate determination of genetic lines that carry resistance and targeting breeding programs to utilize the identified resistant lines. Identification of different viruses on the basis of visual disease symptoms has proved to be quite inaccurate.

Some identification protocols are being used to expedite more effective plant quarantine procedures in the U.S. and other countries (ARS-USDA, Cornell, Purdue).

Wide Crossing New and refined techniques have been developed to facilitate crosses between lines containing useful genes thereby overcoming barriers that previously prohibited moving genes among them. They include embryo rescue, improvements in regenerating plants from callus tissue, and a number of biotechnology techniques for transfer of discrete genetic traits. Several of the project leaders are making important contributions of this sort.

Crop Species Modeling Corn and wheat models already are proving useful through improved varietal testing procedures which identify limitations in production and ecological adaptation to best stimulate a basis for government policy modifications. The barley model nearing completion will have similar merits (Michigan State).

We have recommended that the Special Research constraints Project be reviewed after all or most of the three-year sub-projects have been completed. If such a review is done, we urge that impact values be included in the criteria of the review to include how IARC research would be limited if the constraints had not been addressed through this program.

SECTION 6 A Revised Framework for Project Management

Given the high transactional costs in implementing the current project, we think it important to search for alternatives that would conserve fiscal and human resources and preserve as much rigor of process and quality of output as possible.

To conserve resources, alternatives must reduce overhead and personnel time involved in constraint selection, pre- and full-proposal development, review and selection. This clearly suggests abandoning or greatly reducing use of the PASA. It also suggests reducing the number of annual constraints and pre- and full-proposals addressed. A reduction but not necessarily elimination of scientific peer panel involvement is called for. Finally, an alternative contracting, management, documentation and accounting model is required.

On the other side, it is, in our view, important that the revised model retain the rigor of the current selection and monitoring process. We believe this is essential to ensure quality of the research.

6.1 Alternatives for Sub-Project Design and Implementation

As mentioned above, the team is concerned about the high transactional cost of the project as presently structured. We have discussed a range of alternatives that we think can materially reduce the complexity of process without a great loss in scientific rigor or quality of resulting research.

A. Constraints Identification and Selection

We think the current process of constraint identification, selection and screening is appropriate. We would urge that a reasonable ratio of selected constraints to sub-projects be maintained, perhaps at 1.5 or no more than 2 to 1. Constraint nominations should not exceed two per eligible IARC so long as funding is held to \$1 million or less per year.

B. Pre-proposal Invitation

We believe that this step can be handled in-house in S&T/Agr utilizing resource lists available from the current contractors. Some part-time assistance in this step could be drawn through PASA with USDA if necessary.

C. Pre-proposal Screening

We think that the IARCs have the capability and interest to screen down the pre-proposals on the constraints selected by the PRC. This would enhance the feeling of ownership of the activities by the IARCs as well as provide a competent assessment

at this stage. S&T/Agr could monitor this process, calling on PRC as needed.

D. Invitation of Full Proposals

We believe that this can be handled adequately by S&T/Agr.

E. Peer review of Full Proposals

A peer review of the full proposal is important to assure the scientific integrity of the program. We think that this can best be done by drawing CSRS resources through a PASA. This would provide assurances of drawing the best in peer reviewers. An alternative could be "piggy backing" on the Science Advisors process for this step in the process. Although the two programs vary in some important respects, the addition to the AID/SCI load would be nominal and could be offset by S&T/Agr assistance to the AID/SCI review process coordinator.

F. Final Screening and Prioritization of Full Proposals and Selection of Sub-Projects to Fund

We suggest that the PRC is the proper vehicle for final screening and prioritization of sub-projects based on peer review of the full proposals. Again IARCs can review the PRC recommendations following which S&T/Agr can make the final selection.

G. Funding and Management of the Sub-Projects

There are several ways that funding and management can be handled. Given the small number of grants involved, S&T/Agr could make and manage the grants in-house. Alternatively, funds could be passed to the IARCs, either as a separately identified part of the annual core contribution or as a specific Chapter 4 grant. The funds could be applied as specified in the approved sub-project proposal. The IARC would have responsibility for making and managing the sub-project grant to the involved U.S. institution. AID could set such technical and fiscal reporting as deemed appropriate. Funding and management through the IARC could both relieve the management load in S&T and at the same time further enhance the relationship between U.S. institutions and the IARCs. We do not see scope for using private firms for managing the program.

6.2 Cost Implications

Two types of savings would result from the process changes suggested: 1) Reduced overhead under the PASA, and 2) Reduced inputs of professionals in screening and evaluating projects. There would also be a nominal shift in workload among organizations - generally away from the U.S. scientific community

and toward the IARCs and away from USDA and toward AID. These shifts would largely be offset by a significant reduction in total load.

In terms of project outlays, major savings would be in reducing (or essentially eliminating) USDA overhead recovery which now amounts to about one-fifth of the total available funds (in 1987, 1988 and 1989), an amount sufficient to fund at least one additional sub-project each year).*

Although it is very difficult to estimate the savings in personnel costs, we think the savings in peer reviews of pre-proposals alone would be of the order of one scientist-year per year. Limiting the number of constraints and full proposals could generate further savings to the system.

* We do understand that USDA is reassessing the manner in which overhead is handled on pass-through activities of this type. The intent would be to eliminate what appears to be dual overhead on the sub-project grants. At state institutions, audited overhead is limited to a fixed dollar amount on sub-contracts. If elected by USDA, this would reduce overhead recovery to a level that would make continued use of the PASA much more attractive.

SECTION 7 Findings, Conclusions and Recommendations

7.1 Findings

- 1) Although at Funding levels considerably less than projected in the project paper, the project has identified important constraints at the IARCs and excellent U.S. scientific resources to collaborate in resolving them. Relevance to IARC programs and thus to problems of LDCs is high.
- 2) Sub-projects funded under the project are of high quality and up to now appear to be very productive. The results appear to be useful to both the IARCs and the U.S. institutions.
- 3) Substantial technical inputs beyond those funded by the project have been made by both the IARCs and the U.S. institutions involved in sub-project activity.
- 4) Collaboration has extended both horizontally and vertically at both U.S. institutions and IARCs. Even at this early stage, there is evidence of the spread and utilization of project outputs.
- 5) There is considerable evidence that the project has stimulated development of new and enhanced existing linkages between the U.S. agricultural science system and the IARCs, well beyond the specific funded sub-projects.
- 6) The project is quite consistent with AID mandates, policies, and guidance documents.
- 7) There is no apparent duplication or conflict between this project and other AID funded activities, i.e. AID/SCI, S&T/RUR, or Small Activities programs. We think, on the other hand, that there is complementarity with other projects in S&T/Agr, notably the CRSPs, the Biotechnology and Tissue Culture projects, IBSNAT, and the small grain activities.
- 8) There is great potential for benefits to both US science and US agriculture through this project.
- 9) USDA's management of the activity has been competent and of good technical quality, although incurring high transactional costs.
- 10) There was considerable concern expressed about the low level of funding for both the total project and the sub-projects. Projects funded to date have only scratched the surface of opportunities amenable to this approach.
- 11) The process of sub-project selection, although highly rigorous, has high transactional costs, i.e. fiscal and human

resources of U.S. institutions. There is a pervading view among those that we talked with that there was substantial "overkill", given the small number of grants that could be made. Data provided indicate that the winnowing process leaves a very high disappointment to satisfaction ratio.

7.2 Conclusions

1) The project even at this infant stage has demonstrated sufficient benefits to both U.S. and IARC research programs to warrant continuation.

2) If continued, the project should be expanded substantially in order to more fully capture the opportunities that this approach embraces.

3) Substantial improvements in efficiency and cost effectiveness are possible without significant loss of rigor in project selection or quality of performance. These improvements should be implemented if the project is extended.

7.3 Recommendations

1) We recommend extension of the project for a second five-year cycle and expansion of annual funding to at least the level projected in the original project.

2) We urge substantial simplification in the solicitation, review and screening process to conserve both fiscal and human resources.

3) We suggest a follow-up technical assessment of the 27 sub-projects funded by the project to date after results from all of them are known. The IARCs whose research constraints were addressed can provide evaluation of the impacts.

ANNEX A

Scope of Work

Annex A

Scope of Work

I. The evaluation team shall evaluate the:

A. System to:

1. Determine if it is the most cost-effective one. Discuss alternative implementation and funding methods such as earmarking certain amounts from IARC core budgets to be used for research by U.S. Institutions with present management, management by A.I.D. intermittent employee, management by IARCs and direct IARC contracts, management by private contractor and others. Include cost analyses for alternatives.
2. Review the terms of the PASA agreement in detail and assess the degree to which USDA is meeting terms and conditions, such as:
 - a. Financial Reporting
 - b. Trip Reports
 - c. Annual Progress Reports
 - d. Travel requests and approvals
 - e. Project award system
 - f. Management of the grants
3. Review terms of subgrants managed by USDA and compliance by grantees. Are there standardized guidelines for financial reporting? Are expenditures reported on a timely basis by the subgrantees and the USDA? Are expenditures charted so that A.I.D. can easily associate expenditures with approved activities and line item categories?
4. Describe the relationship with Science Advisors program, HBCU program grants program and S&T small activity project and determine if there is any overlap, duplication or coordination.

B. The Research Projects to:

1. Report on the quality of the research projects, their progress and to what extent the centers will utilize the results in their programs.
2. Determine if research funding is adequate in annual funding and funding per project.
3. Determine the cost effectiveness of the project for the centers.

4. Assess the importance of the established research networking linkages to the IARCs and the U.S. institutions and determine if the linkages resulted in a lasting relationship for after project completion.
5. Determine the value of the research results to U.S. agriculture.
6. Describe potential contribution to attaining objectives of S&T/AGR guidance message and the new focus statement for the 103 account.

C. Future Directions to:

1. Make recommendations as to implementation and management of the programs.
2. Make recommendations as to required amount of funding and funding sources such as buy-ins by missions, other donors etc.
3. Make recommendation as to project continuation/termination.

II. Time Frame of Evaluation:

The evaluation will be conducted by a two member team April 1 - July 30, 1989.

III. In order to perform this evaluation the review team shall:

- a. Review background documents such as PASA Agreement and PP.
- b. Meet with AID, OICD, and CSRS contract personnel.
- c. Visit an International research center.
- d. Review notes of meeting between project manager and research managers at the Annual American Agronomy in 1988.
- e. Review the objectives and goals of the project.

IV. Qualifications of contract Team members:

1. Evaluation Specialist (Contractor) Team leader:

Education: A minimum of a master's degree or equivalent, preferably in business administration, public administration, economics, or agriculture is required (Ph.D. is desirable).

Experience: Fifteen years of successful business or government experience (including research administration) at executive managerial levels with an emphasis on development work in LDCs and experience in evaluation of scientific research and development projects is essential.

Knowledge and Ability: Requirements include: (1) full understanding of project appraisal techniques of the agency's project documentation procedures; (2) broad understanding of economic development and project administration; (3) thorough understanding of AID legislation, policies, procedures and regulations pertaining to project design and implementation; (4) the ability to deal effectively with officials at all levels in government and the private sector; (5) ability to analyze issues; (6) understanding of agricultural research projects and their management.

2. Agronomist/Researcher (Contractor):

Education: A minimum of a Ph. D. Degree or equivalent in Agricultural Science.

Experience: A minimum of ten years experience in Agricultural research and familiarity with Agricultural Research programs in LDCs, IARCs, and developed countries.

Knowledge and Ability: Full understanding of Agricultural research projects, especially in the area of biotechnology, knowledge of the IARCs general research programs, their weakness and their strengths.

V. Reports:

Oral presentations on the team's findings shall be made by the contract team to S&T/AGR and to Agency representatives during the last week of preparation of the draft report.

Three copies of a draft report shall be submitted for S&T/AGR review 30 days before the complete date of the delivery order.

Twenty final reports shall be submitted to the Project Manager, Frank Mertens, S&T/AGR before the completion date of the delivery order.

ANNEX B

Individuals Interviewed

Annex B

Individuals Interviewed

AID/S&T

William Furtick
David Bathrick
Harvey Hortik

Frank Mertens
Dana Dalrymple
Robert Bertram

AID/SCI

Howard Minners
John Daly

USDA/OICD

Greg Garbinsky
Charles Patton
John Hyslop

USDA/CSRS

Sam Wiggans
Wayne Keim (Contracted from Colorado State University)

USDA/ARS - Beltsville, MD

Roger Lawson
John Hammond
Hei-ti Hsu

Cornell University, Ithaca, NY

Steven Slack
Helen Griffiths
Laura Tufford
Guillermo Sanchez

Robert Plaisted
Kenneth Wing
David Call

Purdue University, Lafayette, IN

B.R. Baumgardt
Richard Lister
Bob Klein
Greg Webby
Brian Larkins
Peter Ueng
Jeff Vincent
Eldon Ortmar
Bruno Moser
P.M. Hasegawa

Bud Harmon
John Patterson
Jerry Cherny
Debbie Cherny
John Axtell
Lowell Hardin
Larry Murdock
Sherry Schnapps
Peter Dunn
Richard Shade

Univ. of Nebraska, Lincoln, NB

C.O. Gardner
Blaine Johnson
Darrell Nelson

Michigan State University, East Lansing, MI

Joe Ritchie

IFDC, Muscle Shoals, AL

Doug Godwin
Michael Thompson

CIMMYT, El Batan, Mexico

Don Winkelman
Ron Cantrell
John Mihm
Jose Crossa
Bobby Renfro
Chen Yen Tang

S.K. Vasal
George Varughese
Peter Burnett
Monica Mezzalama
Mujeeb Kazi
Roger Rowe

ANNEX C

Itinerary

Annex C

Itinerary

- May 24 - 28, Washington, D.C.
Reviewed documents; had discussions with individuals at AID, USDA/CSRS, and USDA/ARS at Beltsville, MD.
- May 1, Cornell University, Ithaca, NY
Reviewed sub-project with principal investigators and their associates; had discussions with relevant administrators.
- May 2, Purdue University, Lafayette, IN
Reviewed three sub-projects with principal investigators and their associates; met with relevant administrators.
- May 3, University of Nebraska, Lincoln, NB
Reviewed sub-project with principal investigator and associates; met with relevant administrators.
- May 4, Travel
- May 5, International Fertilizer Development Center
Muscle Shoals, AL
Reviewed sub-project of Michigan State University/ICARDA/IFDC with principal investigator and IFDC collaborator.
- May 6, Travel
- May 8 - 9 International Maize and wheat Improvement
Center, El Batan, Mexico.
Reviewed five sub-projects with CIMMYT collaborators; had discussion with relevant administrators.
- May 10 Travel
- May 11 - 17 Washington, D.C.
Continued review of documents; met with relevant USDA/OICD and AID personnel; drafted report; conducted debriefing at AID.
- May 19 - 31 Silver Spring, MD and Seattle, WA
Continued review and refinement of the draft report and preparation of the final report.

ANNEX D

Letter Request to IIRCs

ANNEX D Letter Request to Directors General of IARCs

PRAGMA CORPORATION
Agriculture Division
116 East Broad Street
Falls Church, Virginia 22046
Panafax Number: (703)237-9326
TELEX: 203507 PRAGMA FSCH UR

April 28, 1989

Directors General
International Agricultural Research Centers

Dr. T. S. Ronningen and I have been asked to make the mandated overall review of the Agency for International Development (A.I.D.) funded project "Collaborative Research on Special Constraints for International Agricultural Research Centers." We are reviewing the approved project outlines and progress reports of projects funded under that program, buttressed by site reviews at a few universities where the research is being done. We will contact scientists and others who may provide additional insight from the U.S. university perspective.

Our direct contact with the International Centers will be limited to CIMMYT and IFDC. The full thrust of our report will reflect more accurately the total situation, and our recommendations will be more meaningful for the future if we also can be privileged with certain perceptions from knowledgeable persons at other Centers.

Therefore, we request reactions, perceptions and recommendations you care to give us on one or more of the following topics that will help us make our appraisal report more effective.

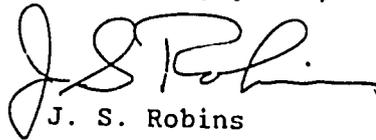
1. Recognizing the newness of the program, has it produced or do you believe it can produce useful solutions to overcome research constraints at your Center? Do you think that such solutions generally will lead rather directly to products and methodologies that are useful to the developing world?
2. In the context in which this program views research constraints, do you see at your Center: (a) a few, (b) many, or (c) a great many that might yield to this collaborative approach?
3. Do you believe that the program has or will foster new or stronger linkages with the U.S. scientific community? Do you think these linkages, if developed, will endure after the specific constraint project is completed? Are there circumstances that would seriously limit continuation of the relationship?
4. Are there changes in either the concept or the process of the Special Constraints Project that you think would increase its productivity or efficiency?

We recognize that this relatively new program merits more than appraisal of its current situation. Some of the research has just begun. Therefore, we believe its foreseeable potential should also be addressed. You, who are the primary intended users, can help us with the kind of judgement and informed appraisal that can add credible substance to that dimension of our report.

We will begin drafting our report immediately upon returning from CIHMYT on May 10, 1989. Your response by that time would facilitate our consideration of your input. Please panafax or telex to the Pragma number.

Thanks in advance for your help.

Very truly yours,



J. S. Robins

ANNEX E

IARC Responses to Letter Request

IARC Responses to Letter Request

Retyped for Legibility

To: Dr. J.S. Robins

From: Douglas Laing, Acting Director General, CIAT

Thank your message of 28 April with respect to the Constraints Program. CIAT has been a beneficiary of two projects to the constraints program. The first with Dr. Jesse M. Jaynes of Louisiana State University and the latter with the University of Florida. The first project has been approved since 1986 and has proved a useful connection between CIAT and one of the leading researchers in biotechnology in the United States. We have expectations that the project will lead to very useful outcomes with respect to Cassava, particularly in relation to genetic transformations to improve root protein content. The second project which will begin this year, has enormous promise for CIAT and is one which has been prioritized for some years. This project allows scientists at the University of Florida to work very closely with CIAT scientists in resolving some of the very important and critical constraints to Phaseolus bean yield which we now face. Thus in general and answering your first question, we believe the constraints program, in principle is well oriented, allowing CIAT to develop close collaborative linkages with advanced researchers in the United States thus helping us to resolve some of these key problems that we now face and for which we do not have a comparative advantage to conduct the research ourselves.

Answer to the second question: In general we find that the number of projects which have been approved is very low. We have prioritized other projects for consideration by the administrators of this program but we have been told repeatedly that very little funding is available. Thus CIAT has been limited in it's collaborative research linkages within the United States because of the paucity of funding for this type of activity. One of the problems we find with the constraints program has been the rather heavy bureaucracy required and the long time scale before projects are approved.

Answer to the third question: Yes, we do believe that the program will foster stronger connections particularly with the US Universities. CIAT has been for many years trying to develop this but we have been under severe financial constraints in doing so. Under no circumstances would we want to see any limitations on this particular program. CIAT is strongly in support of the constraints program and

wish it more flexible in providing more funds for more collaborative projects with United States scientific community.

As an example, one outstanding project which CIAT considers of high priority importance is related to advanced studies on the metabolism of Cassava. Recently CIAT scientists discovered that Cassava (*Manihot Esculenta*) is a C3-C4 intermediate in terms of its metabolic pathway. This information provides the world with possibilities for ground breaking research on the yield constraints in Cassava. CIAT is not in a position to be able to carry out the next step in this research on this C3-C4 plant and we had proposed to the constraints program a project in the United States to work with us in a collaborative way to resolve some of the basic questions which still remain to be answered.

Unfortunately this project has not been approved because of the lack of sufficient funding for all the projects which had been proposed. We feel this puts us back considerably and we are presently seeking collaborative linkages with Australia to try to do the same work because of the failure of the constraints program to provide the funding within the United States.

In answering question number 4, we think that the bureaucratic procedures surrounding the special constraints project have been excessively demanding and that time delays have been considerable. In view of the small size of the projects that have been approved, it seems that there is an overkill in the design of the bureaucratic procedures for such small amounts of money. We would strongly suggest that some action be taken to bring about and improvement in flow of project proposals with faster turn around and a quicker and possibly somewhat less democratic process of selecting the contractors. In many cases the International Centers have already identified the best person within the United States who could carry out this work. This information should be taken into account to some extent before a long and very complicated process is put in place for what are quite small research grants.

We trust these comments will be useful. Sincerely,

Douglas R. Laing
Acting Director General
CAIT COL

To: AID.SI.AG (CGI901)
From: ICRISAT (CGI505) Delivered: Thu 4-May-89 15:18 EDT Sys 157 (47)
Subject: (CBNO-89/01922) 4.5.1989
Mail Id: IPM-157-890504-137910114
Acknowledgment Sent

message for J.S. Robins

Subject: Collaborative research on special constraints

ICRISAT fully supports the special constraints research program of AID.

A cooperative project of ICRISAT with the University of

Chicago on Striga was recently recommended for funding. A visit with Dr. Lynn convinced me that the research in his laboratory can provide the molecular data needed by ICRISAT to develop successful control methods for this parasitic weed. The research promises not only to overcome present research constraints, but also to provide a useful end product. The funding provided however, is less than twenty percent of what is needed to complete this research within the next five years.

2. At ICRISAT we have need for basic research in which we do not have the expertise, but is needed for breakthroughs in developing resistance to biotic and abiotic stresses in our mandate cereals and legumes. This includes research on breeding technologies, molecular basis of resistance, and gene transfer.
3. The program can certainly foster close links with US scientific institutes, particularly non-landgrant universities and private industry. Such links will endure as long as research needs demand cooperation.
4. ICRISAT would suggest (a) an increase in the maximum annual financial commitment to each grant; (b) a wider selection of experts to review these research applications; (c) a financial contribution to the cooperating IARC to facilitate communication among scientists through exchange visits of scientists.

Finally, ICRISAT recommends that major constraints be identified, and that research on these be adequately funded to solve these problems within a set time schedule not to exceed five years.

Regards, J.M.J. de Wet, ICRISAT Center, India



INTERNATIONAL POTATO CENTER (CIP)

Address: Apartado 5969, Lima, Perú. Cables: CIPAPA - Lima
Tolux: 26672 PE. Telephones: 366920 - 354354

L-081-CIP-89

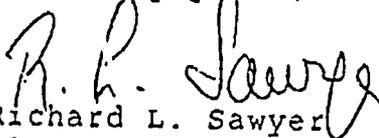
May 12, 1988

Dr. J.S. Robins
Pragma Corp.
Agriculture Division
116 East Broad St
Falls Church, Virginia 22046
U.S.A.

Dear Dr. Robins:

Attached is information concerning collaborative research on special constraints which you requested. We will be very pleased to answer any specific questions you may have.

Sincerely yours,


Richard L. Sawyer
Director General

cc. P. Gregory

MEMORANDUM

M-14-R-89

May 12, 1989

TO: Dr. Richard L. Sawyer, Director General

FROM: *Peter Gregory*, Director of Research
Peter Gregory

SUBJECT: AID Special Constraints

With respect to the information requested by Dr. Robins, we had a very effective collaboration with Dr. Steven Slack who was at the University of Wisconsin (now at Cornell). The project, "Chemotherapy and Thermotherapy of in vitro Potato and Sweet Potato Plantlets", has helped facilitate the cleanup of 40 clones/month versus the previous 4 clones/month. Thus, an important constraint to potato germplasm distribution has been removed.

These grants are very useful provided the focus is on clearly defined practical constraints.



THE INTERNATIONAL CENTRE OF
INSECT PHYSIOLOGY AND ECOLOGY
P.O. BOX 30772, NAIROBI, KENYA

Professor Thomas R. Odhiambo, Director

OUR REF: S4/USAID/102/227

5th May 1989

Dr. J. S. Robins
Pragma Corporation
Falls Church, Virginia 22046
USA

Panafax No. (703) 237-9326

Dear Dr. Robins,

COLLABORATIVE RESEARCH ON SPECIAL
CONSTRAINTS FOR IARCS: Assessment

Many thanks for inviting our perceptions on USAID collaborative Research on Special Constraints for International Agricultural Research Centres.

We believe that fruitful and lasting research linkages can be fostered by this Programme which has potential for alleviating developmental concerns in the developing countries.

We believe that improved coordination by the Central Programme Office for the potential collaborators would make the programme more effective and efficient. For example, there should be direct consultation between the USA collaborators with the developing country institution; and for the latter to be deliberately allowed more participation in the formulation of the project and the choice of the collaborator.

In the case of the ICIPE, our projects under this Programme have been delayed because communication was not channelled to the more suitable potential collaborator. We hope that your review will assist in improving the coordination and thereby facilitate the project selection process.

As an institution, we look forward to participating in this Programme.

With best wishes.

Yours sincerely,

THOMAS R. ODHIAMBO
Director, ICIPE

PHONE: NAIROBI 802501/3/9 FAX 803360

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INTERNATIONAL LABORATORY
FOR RESEARCH ON ANIMAL DISEASE

P.O. Box 30709, Nairobi, Kenya

Email: BT GOLD 74 : CGU 005
Telefax: 593499

Telephone 592311
Telex: 22040 'ILRAD'
Cable: ILRAD/Nairobi/Keny

Ref:DIR/RES.9.03

3rd May 1989

FAX 703-237-9326 (USA)

Dr. J.S. Robins
Pragma Corporation
Agriculture Divisio:
116 East Broad Stre:
Falls Church
Virginia
U.S.A.

Dear Sir

Re:"Collaborative Research on Special Constraints for Agricultural
Research Centers"

Our comments in response to your questions on the above topic must
be reviewed in the light that, unlike most other CGIAR Centers,
ILRAD focuses on basic, upstream research at the highest
international level.

Our view of the programme is therefore not one of "constraints" but
rather collaborative research which would enable us to solve basic
research problems more effectively in terms of both time and
resources.

From the ILRAD perspective the answers to points 1-4 would be as
follows:-

1. Perhaps - the problems would need to be simple in view of the
limited financial resources available to each project, if these
are to be the sole source of funding.
2. A few.
3. Continuation of linkage would depend on availability of funds,
from whatever sources, to continue research.

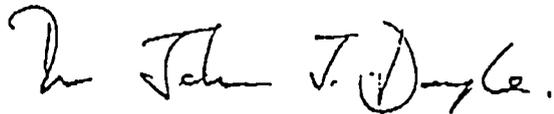
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7'
-17

-2-

4. The process of submission and review of the projects considered for funding under this programme is long, cumbersome and inefficient. In our case, the process and the comments of ill-informed referees have actively hindered on-going, informal, collaboration with two major universities in the United States.

We hope you find these comments useful.



Dr. John J. Doyle
Director of Research

JJD/rkn

INTERNATIONAL LIVESTOCK CENTRE
FOR AFRICA

CENTRE INTERNATIONAL POUR L'ELEVAGE
EN AFRIQUE

ADDIS ABABA ETHIOPIA

TO: (703) 237-9326	SUBJ:	
ATT: Dr J.S. Robins	REF: ADG/386 / FAX / 03696.	
FROM: R. Stewart	DATE: 5/6/89	PAGE 1 OF 1

AID.ST.AG (CG1901)
Dr J.S. Robins
PRAGMA COOPERATION
Agriculture Division
116 EAST BROAD STREET
Falls Church of Virginia 22046

Date: 2 June 1989

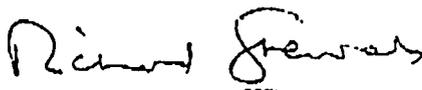
Ref. Your enquiry dated 28 April 1989 re. your review of AID's Collaborative research on special constraints for IARCs. Dr John Walsh has asked me to reply on his behalf.

To answer your questions:

- 1) Yes, the Programme can produce useful solutions to overcome constraints at ILCA. Yes, such solutions will lead directly to products and methods useful to the developing world, if the research covered forms part of an overall programme with a commodity focus.
- 2) I see several constraints relevant to ILCA's work that might yield to the collaborative approach.
- 3) Yes, the programme is fostering closer links with US scientific community. Yes, such links are likely to endure after project completion.
- 4) I would suggest that US universities submitting proposals for the special constraints programme be given better access to (e.g. ILCA's) strategy and research plans before preparing proposals. A few of the proposals that have been prepared in the past have not fitted well with our overall research programme.

Hope this reaches you in time to be of use.

Yours sincerely,



Richard Stewart
Donor and Board Secretariat, ILCA-Addis



International Institute of Tropical Agriculture

Oyo Road, PMB 5320, Ibadan, Nigeria • Telephone: 400300—400314 • Cable: TROPFOUND IKEJA
Telex: TDS IBA NG 20311 (BOX 015) or TROPIN NG 31417
9 May, 1989

Dr. J.S. Robins
Pragma Corporation
Agriculture Division
116 East Broad Street
Falls Church
Virginia 22046
USA.

Dear Dr. Robins:

Re: Collaborative Research on Special Constraints for IARC's

Since the above-mentioned program is indeed very new as you point out, our comments will tend to be somewhat general, but, hopefully will be of some use to you. We apologize that our response will not meet your deadline, but trust you will understand that Fax and E-Mail are not everyday working tools yet, here in Nigeria.

Let me begin by saying that I believe that the program has great potential, and can certainly lead to solutions which will be beneficial to the developing world. Clearly, it is not cost-effective to try to do certain types of research here, which can be more effectively performed elsewhere. As you may know, IITA has, for example, contracted out research in biotechnology to Purdue University, as well as other relationships with the University of Hawaii and Michigan State University. These projects are not part of the Constraints program, of course, but I believe are representative of the same spirit: that of recognition of areas where other institutions have a comparative advantage, and entering into collaborative ventures which benefit all parties - the University involved, the IARC and most importantly, the developing world.

I believe that the program will also foster stronger linkages with the U.S. scientific community, and that it will be mutually enriching. In my experience, once linkages are made, they tend to develop and expand.

In terms of changes in concept or process of the Project, I believe the concept is good, but would suggest that part of your study would comment on the process of project selection and the flow of communication to all concerned.

In closing, IITA commends A.I.D for its conceptualization of the project, and trust that we will benefit from it in the years to come. Thank you for inviting us to comment.

Sincerely,

Ken S. Fischer
Deputy Director General-Research

From: IRRRI (CGI401) Delivered: Thu 25-May-89 2:42 EDT Sys
Subject: Message for Dr. J.S. Robins
Mail Id: IPM-157-890525-024381024

MAY 25 RECD

23 May 1989

Dear Jack:

This is in reply to your e-mail to all center Director Generals to provide assistance in the review of the AID funded " Collaborative Research on Special Constraints for International Agricultural Research Centers." Our replies to the points you raised are summarized in attachment 1. For some background information, I enclose a list of projects and programs conducted at IRRRI with the financial support of USAID, including those that do not belong to the "Bottleneck projects" (attachment 2).

I hope you find the information useful.

Sincerely yours,

Hubert G. Zandstra
Deputy Director General

Dr. J. S. Robins
Fragma Corporation
Agriculture Division
116 East Broad Street
Falls Church, Virginia

Encl: Attachment 1
Attachment 2

Attachment 1

1. Recognizing the newness of the program, has it produced or do you believe it can produce useful solutions to overcome research constraints at your Center? Do you think that such solutions generally will lead rather directly to products and methodologies that are useful to the developing world?

Yes.

2. In the context in which this program views research constraints, do you see at your Center: a) a few, b) many, or c) a great many that might yield to this collaborative approach?

Many.

3. Do you believe that the program has or will foster new or stronger linkages with the U. S. scientific community? Do you think these linkages, if developed, will endure after the specific constraint project is completed? Are there circumstances that would seriously limit continuation of the relationship?

Yes, but continuity will be helpful. We do not visualize any circumstances at present that would seriously limit the continuation of relationships with the US scientific community, if we follow the normal procedure of collaboration.

4. Are there changes in either the concept of the process of the Special Constraints Project that you think would increase its productivity or efficiency?

In several cases, continuity would be helpful. The potential of the projects to be pursued are great and the projects at IRRI have been very helpful to the research programs.

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To: AID.ST.AG (CGI901)
From: IRRI (CGI401) Delivered: Thu 25-May-89 2:44 EDT Sys 157
Subject: continuation of the mssg. for Dr. J.S. Robins
Mail Id: IFM-157-890525-024740741

Attachment 2

List of Collaborative Projects Supported by USAID at IRRI

Collaborative Programs with Various Rice Producing Countries

Title : Egypt-IRRI Research and Training
Project
IRRI Scientist : Various departments

The Ministry of Agriculture and Land Reclamation of Egypt received a 4-year grant from USAID to establish a National Agricultural Project administered by the Director General of the Agricultural Research Center at Giza with the technical assistance of IRRI. The program will continue the development of the Rice Research and Training Center at Sakha earlier constructed with USAID assistance.

Title : Madagascar-AID/IRRI Malagasy Rice
Research Project (Phase II)
IRRI Scientists: Various departments

The project enables IRRI to develop mechanisms linking the GRDM and IRRI to upgrade human resources through degree and nondegree training, and institutional capacity for rice and rice based farming systems research.

Title : BRRI-IRRI Rice Research and
Training Project (Phase III)
IRRI Scientists : Various departments

This project assists Bangladesh develop its research capability through collaborative research and training with the Bangladesh Rice Research Institute. Phase III is jointly funded with the CIDA.

Collaborative Research Projects with IRRI Scientists

Title : Removing soil-structural
constraints to the production
of maize and legumes following
rice

IRRI Scientist : T Woodhead, Soil Physicist

The project investigated seeding, crop establishment and tillage for legumes following rainfed lowland rice.

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Title : Application of monoclonal antibody to rice virus epidemiology in the tropics

IRRI Scientist : H Hibino, former IRRI Plant Pathologist

Monoclonal antibodies were produced in collaboration with ATCC and applied to research on rice virus epidemiology at IRRI and in national collaborative research programs.

Title : Rice somatic embryogenesis

IRRI Scientist : F J Zapata, Plant Physiologist

Embryogenic suspension cultures of different varieties coming from two types of explants were established. Various media have been identified as required by each genotype. Seeds from wild rices and cultivated species had been prepared for inoculation into callus induction medium in preparation for cell suspension cultures.

Special Constraints Projects

Title : Developing models to predict favorable environments for rice blast in the tropics

IRRI Scientists: J M Bonman, Asso. Plant Pathologist
F S Teng, Asso. Plant Pathologist

The project aims to develop an empirical model for relating blast severity, especially neck blast infection, to weather based data collected at the IRRI experimental farm. It will also test and modify models to make it applicable to other locations in tropical Asia.

Title : Species relationships and cytogenetics in the secondary gene pool of rice

IRRI Scientists: D A Vaughan, Asso. Geneticist
D Hautea, UPLB Geneticist

The project will determine the relationship between the nine species of the "Oryza latifolia complex" which comprise a secondary gene pool of rice found in Asia, Africa and America. It will also investigate the cytogenetics of polyploidy in species of the secondary gene pool of rice.

Title : High density grain filling in rice
IRRI Scientist: B S Vergara, Plant Physiologist

The results of this project will generate knowledge on the exogenous application of FGR to enhance grain density, in developing a screening test for high density grains, and in incorporating FGR characteristics for HD grains in the breeding program for high grain yield potential.

Title : Method for improved cooking and texture evaluation of cooked rice
IRRI Scientist: B O Juliano

Basic studies on rice cooking and cooked rice hardness/stickiness on selected pairs of rice, would lead to the development of a simple and more sensitive method for measuring cooked rice texture, which would be useful to breeding programs.

ANNEX F

Communications from Program Participants



United States
Department of
Agriculture

Agricultural
Research
Service

Beltsville Area
Beltsville Agricultural
Research Center

Beltsville, Marylan
20705

May 9, 1989

Dr. Thomas Ronningen
1919 Blackbriar Street
Silver Spring, Maryland 20903

Dear Tom:

It was a pleasure meeting you last week. Enclosed is the information we discussed related to the expanded value of this International Institute for Tropical Agriculture funded project as it extends to other scientists and research centers around the world.

If you need further information, please let me know.

Sincerely,

ROGER H. LAWSON, Research Leader
Florist and Nursery Crops Laboratory

Enclosure

United States Department of Agriculture
Agricultural Research Service
Florist and Nursery Crops Laboratory

Other United States Department of Agriculture, Agricultural Research Service (USDA-ARS) collaborations or contacts arising as a result of the United States Agency for International Development (USAID) funded work -- cooperation with the International Institute for Tropical Agriculture (IITA):

Viruses of Sweet Potato and Yams

1. Between USDA-ARS and CIP.

The sweet potato world mandate has been transferred to the Center for International Potato (CIP). Two monoclonal antibodies have been supplied to CIP as well as to IITA for use in the virus-testing program. In addition, a post-doctoral scientist based at CIP visited USDA-ARS to prepare complementary DNA to two potato and one sweet potato virus. She was aided in this work by Dr. Hammond. Provision of other reagents to CIP as well as to IITA is expected.

2. Between USDA-ARS and AVRDC.

Dr. Hei-ti Hsu developed monoclonal antibodies for the IITA for a sweet potato virus indexing program. These antibodies are also available through a joint project between the Office of International Cooperation of the United States Department of Agriculture and the Council of Agriculture, Taiwan, to the Asian Vegetable Research and Development Center (AVRDC) for a sweet potato virus indexing program. In addition, Dr. Hsu has developed a joint project through USAID, with AVRDC to develop monoclonal antibodies for mycoplasma-like organisms infecting sweet potatoes.

3. Between the USDA-ARS and NCU.

Collaboration on some aspects of sweet potato virus research with Dr. J. W. Moyer, North Carolina State University. The relationships between some of the sweet potato viruses is being examined in collaboration with Dr. Moyer. Dr. Moyer also has a collaborative relationship with CIP.

4. Within the USDA-ARS.

Some of the reagents produced or used in this study have also been used to aid the National Plant Germplasm Quarantine Laboratory, for the purpose of screening sweet potato germplasm and to prevent introduction of virus-infected material.

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Other Pathogens and Viruses

1. Between IITA and Dr. Sondra Lazarowitz of the Carnegie Institute of Washington in Baltimore.

Potential use of cloned maize streak virus to test IITA maize lines for resistance to maize streak virus in a more efficient manner than is now possible. Contact was made through Dr. Hammond.

2. Between IITA and Dr. Rey-yuh Wu and Prof. Hong-ji Su of the National Taiwan University.

Potential use of monoclonal antibodies developed in Taiwan to test material at IITA for banana bunchytop virus. Contact was made through Dr. Hammond.

3. Between USDA-ARS and ICRISAT.

Dr. Hsu has prepared monoclonal antibodies to tomato spotted wilt virus (TSWV). A potential development of collaboration with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in research on TSWV would be of benefit to international agriculture because TSWV infects not only ornamental floral crops but also peanuts, peppers, tomatoes, lettuce and other economically important food crops.



Department of Plant Pathology
CORNELL UNIVERSITY

334 Plant Science Building
Ithaca, New York 14853 USA

A Department of the New York State College
of Agriculture and Life Sciences, a Statutory
College of the State University at Cornell

Telephone: 607-256-3284 Telex: 937478

May 5, 1989

Dr. Thomas Ronningen
1919 Blackbriar Street
Silver Spring, MD 20903

Re: USAID Program for Collaborative Research on
Special Constraints at the International Agricultural
Research Centers

Dear Tom:

I enjoyed the opportunity to review our research progress on therapy procedures to eliminate viruses from potato and sweet potato with you and Jack Robins. If you have any further questions, please feel free to call me.

After our visit, I felt that it might be appropriate to provide you with a written statement concerning the impact of my research project on world, perhaps more particularly, United States science. In this project, we have developed the methodology for treating plantlets to eliminate viruses after they have been established in an *in vitro*, sterile environment. This aspect of the work takes on a broader significance as one recognizes that potato and sweet potato germplasm are largely distributed among countries as *in vitro* plantlets because the sanitary plant health requirements of various countries require stringent handling procedures. We are now utilizing this same technology for the elimination of viruses from potato and sweet potato stocks in the United States. Also, we have shared this technology with other laboratories in the United States, including the plant quarantine facilities at Glenn Dale, MD. Any exotic potato or sweet potato germplasm which is important to the United States must be evaluated at Glenn Dale before it can be distributed to requesting scientists. They feel that our procedures will help to expedite the movement of this germplasm. In this case the International Potato Center located in Lima, Peru needed our technology but we (United States) needed their germplasm. The impact of this project will be to facilitate both needs.

It seems to me that one of the major strengths of this particular grants program is that it is easy to demonstrate that the United States and U.S. science benefit just as directly as the collaborating International Centers. The world seems to get smaller every year, thus the intellectual and economic resources of various countries are drawn even

page 2
May 5, 1989
Dr. Thomas Ronningen

closer together. I, personally, need the focus derived through international contacts to maintain a balanced perspective of research needs and directions. This particular grant program helps to fill that need.

Sincerely,

A handwritten signature in black ink, appearing to read "Steven Slack". The signature is fluid and cursive, with a long horizontal stroke under the first name.

Steven A. Slack
Henry & Mildred Uihlein Professor
of Plant Pathology

SAS:rb

Information provided by:

Dr. Robert C. Plaisted
Professor of Plant Breeding
Cornell University

(retyped for legibility)

One of the wild relatives of potatoes that grows in Bolivia has sticky hairs on the leaves that protect it from insects. Our goal is to transfer this resistance to cultivated potatoes. This form of resistance is effective against a broad range of insects and it appears to be safe from changes in the insects that might overcome the resistance. To the extent that it reduces the need for insecticides, it reduces the cost of production and the risk of cost of production and the risk of crop loss, and it avoids any adverse impact on the environment that pesticides might have. For U.S. farmers, we think this resistance can eliminate the need for sprays to protect the crop from small insects in most seasons and can reduce the need for about half the sprays applied to control the Colorado potato beetle. Scientists at the International Potato Center have demonstrated the value of this resistance to tuber moth and other pests which attack potatoes in other parts of the world.

The core of the support for the team of a breeder, an entomologist, and a biochemist has come from the State of New York, the USDA, and the International Potato Center. The special grant from USAID has been used to adapt two newer tools of biotechnology to accelerate the breeding program. The first of these has been to use variation induced by growing plants in vitro culture and the other is to improve the process of selection by building maps of the potato chromosomes that will pinpoint the location of the genes of interest and improve selection efficiency. This grant, in addition to improving our tools for selection, is also making it possible for us to share these materials with scientists in Peru, Colombia, Philippines, and Uruguay where they will be evaluating their performance against the potato insects of importance in those places. The entomologist at the International Potato Center is taking an active role in coordinating these trials.

To: Dr. John Robins
Dr. Tom Ronningen

12 May 1989

From: Ron Cantrell

Subject: Review of Special Constraints Projects

The following is a summary of the information that was presented during your recent visit to CIMMYT for review of the three projects funded by AID/S&T Special Constraints. As we discussed the three projects represent three very different types of collaboration. Each of the three have made significant contributions to our program and we would recommend that this type funding be continued in the future. Listed below are the major results of the three projects;

1. Development of Maize Populations with Multiple Resistance to Major Insect Pests- A multiple stalk borer resistant population (MBR) has been developed based on sources of resistance to temperate, subtropical, and tropical maize pests. This population has been subjected to two cycles of multilocation recurrent selection for resistance to several insect pests. Inbreds and experimental varieties have been developed from this population and the preliminary results for level of resistance are very exciting. Also data suggests that this material has some type of generalized resistance to leaf feeding and stalk boring by Lepidopterous maize pests. Many of the participants in the International Symposium on Methodologies for Developing Resistance to Maize Insects, 8-13 March 87, CIMMYT, Mexico saw progenies of this material in CIMMYT research plots, and are eager to request seed of these selected materials, and collaborate to extent they can in screening the progenies of the next selection cycles.

2. Differentiating the Corn Stunt and Maize Bushy Stunt Disease of Latin America- Dr. Gordon developed monoclonal antibodies to Corn Stunt and polyclonal antibodies to Maize Bushy Stunt. These materials have been sent to CIMMYT and we have made good and frequent use of them in differentiating between these two diseases in resistance breeding program.

3. Evaluation, Management, and Utilization of Maize Germplasm and Breeding Systems- see memo from Crossa.

There have been many positive aspects of this collaboration other than information, germplasm, and antibodies produced for the ELISA tests. These projects have provided the opportunity for U.S. scientists to become involved in our research program and gain an awareness of the problems in developing country research programs. Because of these projects we have had many more visits by LDC graduate students studying in the U.S. Obviously the research products are important from these projects but the interaction we have had is equally important.

June 2, 1989

Dr. Thomas Ronningen
1919 Blackbriar ST.
Silver Spring, MD 20903

Dear Tom:

Although too late, some examples of how we have benefitted are:

1. Access to valuable germplasm for the improvement of Corn Belt corn.
2. Development of improved breeding systems for germplasm enhancement and ultimately inbred line and hybrid improvement.
3. Development of techniques for the integration of tropical and sub-tropical germplasm into Corn Belt corns to increase insect and disease resistance as well as to increase yields.
4. Training of personnel in analysis and interpretation of international testing, long-term selection studies, predicting progress from selection, etc.
5. Gaining a better understanding of international environments, their similarities and differences based on climatological data as well as yield performance
6. Gaining a better understanding of genotypic stability and genotype x environment interactions in maize production.

I am sure that there are many other benefits, but these come to mind first. It seems to me that the U.S.A. benefits by having access to useful germplasm for corn improvement, and by having scientists trained in the use of improved techniques for germplasm enhancement which will ultimately lead to improved lines and hybrids.

Page 2
Dr. Thomas Ronningen
June 2, 1987

Many of our studies have been of a basic nature, which have provided answers to questions about transferring genes and making use of the world's maize germplasm resources for maize improvement in this country.

Sincerely,



C. D. Gardner
Foundation Professor

Evaluate, Management, and Utilization of Maize Germplasm and Breeding Systems

TO: R. CANTRELL

FROM: *J. CROSSA

The analysis and interpretation of the accumulated data from the international maize testing program conducted over the last 10-years period was initiated at the end of Nov. 1984.

The data available contains information regarding world testing environments, genotype x environment (GE) interaction, genotypic, phenotypic, and environmental components of variance, stability parameters, etc.

The data was critically analyzed and interpretation focused on development of optimum procedures for (1) population improvement, (2) international testing, and (3) assessing GE interaction and genotype stability across international environments.

As a result of this research several scientific papers have been published. One aspect of the research focused on the estimation of genetic and genetic x environment variance components for ten CIMMYT's maize populations using the historical data from full-sib international progeny trials. (J. Crossa and **C.O. Gardner, 1989, Theor. Appl. Genet. 77:33-38). C.O. Gardner and J. Crossa are currently working on some theoretical aspects of the same topic.

Other part of the work has concentrated on assessing the yield stability of maize genotypes across international environments in all the experimental variety trials from 1979 up to 1984 and to evaluate different statistical methods to select for stability performance. (J. Crossa, 1988, Theor. Appl. Genet. 75:460-467; J. Crossa, B. Wescott, and C. Gonzalez, 1988, Expl. Agric. 24:253-263; J. Crossa, B. Wescott, and C Gonzalez, 1988, Theo. Appl. Genet. 75:863-868).

Extensive statistical analyses to determine combining ability and heterotic patterns among CIMMYT's maize population and pools have been carried out. This research concentrates on determining the optimum procedures for inbred line and hybrid development. Results of the different diallel analyses are in the process of publication in different scientific journals (Maydica and Crop Science)

*J. Crossa is the CIMMYT counterpart on the Nebraska-CIMMYT Sub-Project.

**C.O. Gardner is the Nebraska Sub-Project leader.

Grant Title and Number: "Characterization of barley yellow dwarf viruses (BYDV) in Africa and Latin America". 88-CSRS-2-3237.

Personnel: Richard M. Lister, Brian A. Larkins, David J. Asai, Gregory Webby, Purdue University, W. Lafayette, IN 47907, USA.

Cooperating IARC: CIMMYT, Mexico (Peter Burnett, and Monica Mezzalama).

Amount of Funds Awarded: \$80,000

Starting Date and Length of Project: 12-1-87 - 11-30-89 (now extended to 4-30-90)

Impacts: BYDV comprises a cluster of virus types regarded as the most important virus problem in growing cereals of all kinds, world-wide. Their widespread occurrence, and the potential for epidemic outbreaks, provide a chronic and sometimes disastrous constraint on cereals as a source of food. Their practical control requires the development of cereal varieties that specifically resist local types of BYDV. Breeding programs dedicated to this, of vital interest to CIMMYT, are ongoing in S. America and Africa. This project is dedicated to characterizing, and providing serological and biomolecular tools for identifying, the types of BYDV to which these breeding programs should be directed.

Progress has been excellent. We have prepared a complete panel of antisera capable of detecting and differentiating the major types of BYDV, and they are being used to screen cereal leaf samples mailed to us by collaborating CIMMYT personnel in S. America and Africa. The information emerging from these surveys as to the specific types of BYDV that are important in various regions will enable the CIMMYT resistance breeding programs to focus on developing resistance or tolerance to the appropriate types of BYDV.

The data is also invaluable in amplifying the Purdue program of surveys within the US and elsewhere. This program is designed not only to develop basic ecological and epidemiological data, but also to provide the information our cereal breeders need to focus their effort in BYDV-resistance programs on the defined types of BYDV that cause our regional U.S. problems, be they in wheat, barley, or oats. This becomes even more important as we proceed with our ongoing program of developing genetically engineered cereals that are specifically resistant to the defined types of BYDV. Our ultimate goal is the provision of BYDV-resistant germ plasm of direct use within the US, and as a resource for breeders world-wide. The project is thus an excellent example whereby the use of US expertise to help the "Third World" reaps the dividend of information directly useful to US agriculture, where BYDV constitutes our priority virus problem in the major cereals, with an annual loss estimated to approach one-half billion dollars.

PURDUE UNIVERSITY



DEPARTMENT OF AGRONOMY
CROPS • SOILS • CLIMATE

May 5, 1989

Dr. Thomas Ronningen
1919 Black Briar St.
Silver Spring, MD 20903

Dear Dr. Ronningen:

The International Agriculture Research Centers now invest over 200 million dollars each year in agricultural research. The constraint grants represent one of the few opportunities for U.S. scientists to benefit from scientific achievements being conducted at the IARC's. There are many examples of scientific advances at the International Centers which can have a specific impact on U.S. agriculture. The work being pursued by Patterson, Cherney, and Axtell on mechanisms of forage sorghum digestibility is one such example. ILCA researchers have recently demonstrated that a particular sorghum genotype which occurs in the Gambella region of Ethiopia lacks phenolic compounds which interfere with forage digestibility in ruminant animals. These so called "tan plant" varieties have been picked up by the Indian National Research Programs over the past several years and now the majority of dual purpose sorghum varieties in Northern India are tan plant types with better forage digestibility. The ILCA research data is now available to Patterson and Cherney because of our access through the AID constraint grants. This grant will therefore allow us to expedite the introduction of tan plant forage sorghums into the U.S. for the benefit of U.S. agriculture. It is very important, therefore, that we maintain programs such as the AID constraint grants for the benefit of U.S. agriculture as well as for the benefit of research progress at the International Centers.

Sincerely,

John D. Axtell
Lynn Distinguished Professor

JDA:knc

cc: F.L. Patterson
J. Cherney



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INSTITUTIONAL CONTRIBUTIONS OF AID'S

"Constraints" Projects

An easily overlooked but invaluable product of AID's International Center "Constraints" Projects is this. These collaborative research endeavors help our scientists, university students and the American agricultural community at large acquire "global intelligence."

Why is this internationalization of scientists, students and agricultural leaders so important? Because global access to insights, know-how, genetic materials and research findings is essential if our agriculture is to compete effectively in tomorrow's world. Through work on constraints projects American scientists become directly involved in the culture, production and marketing systems of other countries - nations that are both customers and competitors. By first-hand experience we learn that the U.S. has no monopoly on new knowledge, improved production processes or foreign markets. Lasting linkages to important institutions are forged. Insights acquired are shared with colleagues, students and the agricultural community. Thereby a stronger international capability is built into our institutions - a dimension essential to agricultural research and education in our increasingly interdependent world.



Robert L. Thompson
Dean of the School of Agriculture
Purdue University
5/9/89

ANNEX G

Responsiveness to S&T/Agr Project Selection Criteria

ANNEX G Responsiveness to S&T/Agr Project Selection Criteria

CROSS CUTTING SELECTION CRITERIA

1. The extent to which the problem constrains achieving the goals of the Agency's ARDN focus and Strategic plan.

The entire thrust of the activity is to remove constraints identified by IARCs that are impeding technological breakthroughs that would lead to increased incomes of the poor majority and expanded food availability and consumption.

2. The scientific merit of the program as reflected in its conceptual and technical soundness and scope for providing information to be used to solve development problems of priority concern to the Agency.

The project is rigorous in identifying superior scientific talent in U.S. institutions to assist the IARCs, a major clientele of the Agency that generates solutions to agricultural developmental problems.

3. The extent to which other donor agencies and national governments are addressing the issue.

The IARCs are funded by about 40 national and multinational donor organizations. The issues addressed in this project grow out of this multi-donor supported activity. Several donors support collaborative projects as a part of their contribution to the IARCs.

4. The extent to which AID can exercise the intellectual leverage to facilitate the flow of resources from other U.S., LDC, developing country and international institutions.

LDC's leverage is exerted through it's substantial contribution to the IARCs. The contributions are both fiscal and intellectual as well as in policy terms.

5. The nature of AID Regional Bureau program priorities and their needs for improved technological underpinnings and ST/Agr funded support services in their grant and loan assistance programs at the field mission level.

AID activities at the field mission level are at best secondary beneficiaries, and limited to country spin-offs from programs of the IARCs.

6. The scope for AID to work through the U.S. scientific research community and international scientific networks to contribute to research and training activities in developing countries.

Again, spin-offs from this project to research and training are largely through IARCs involvement with developing countries.

7. Possible benefits to U.S. agriculture.

There are huge potential benefits to U.S. agriculture, both in terms of primary and secondary technologies developed or stimulated by the project and, most importantly, as a result of linkages developed within the global scientific community through participation in this collaborative research.

8. Relationship to and compatibility with other S&T bureau programs.

A variety of relationships exist with several S&T programs, i.e. the CRSPs, IBSNAT, biotechnology and tissue culture projects, small grains activities, etc. in addition to the IARCs. These flow mainly from a common commodity or scientific interest and thus are complementary and highly compatible.

CRITERIA FOR INCREASING INCOMES

1. The current and potential importance of the crop or animal products in LDC consumption and trade.

This project is at least one and perhaps two steps removed from direct intervention in LDC consumption and trade. IARCs and national programs can use the output to help achieve the goal of increasing incomes, consumption and/or trade.

2. The number of actual and estimated potential producers or laborers who stand to benefit through employment, lower costs and higher incomes.

This is impossible to estimate given the nature of the project.

3. Potential savings in land, labor, capital, and other production resources that could be allocated to other agricultural activities or contribute to sustaining incomes by improving the natural resource base.

See previous response.

4. The technical and economic feasibility of the innovation.

Most of the innovations generated will have rather direct technical feasibility in advancing both US and IARC research programs. Economic feasibilities are, again, one or two steps removed from direct application.

5. The strength of future market growth and income earning of a new or improved enterprise.

Not applicable.

6. Whether the adoption of improved technologies is within the grasp of limited resource farmers given available local institutional (e.g. credit) support.

Not applicable.

7. The extent to which a new or improved enterprise spreads the income benefits through its employment of labor and services.

Not applicable.

CRITERIA FOR AVAILABILITY AND CONSUMPTION OF FOOD

1. The contribution of the new technology to improvement of food consumption by utilization of more nutritional crop, livestock, or fish products or through the introduction of varieties with better storage or processing capabilities.

Some of the innovations can lead fairly directly to improved quantity, quality and/or availability of food. Most, however, are more than one step removed, steps that must be taken by IARCs or National programs.

2. The degree to which technological constraints limit LDC farmer diversification into new crop, livestock, or fisheries enterprises which offer special nutritional benefits.

Many of the constraints addressed bear rather directly in limiting LDC farmer options. Again, the constraints are on IARCs and other technical programs, not LDC farmers per se.

3. The value of crop, livestock, or fisheries products that are currently lost in post-harvest handling and marketing.

Not applicable.

4. The relative contributions to increased food availabilities from equal investments made in post-harvest loss reduction and in crop yield increases.

Not applicable.

5. The scope for improving consumption from new product utilization techniques.

Not immediately apparent but probably some scope in future utilization of technologies.

6. Scope for private sector participation in the provision of services and development of new food products for customers.

Not immediately.

CRITERIA FOR MAINTAINING AND ENHANCING THE NATURAL RESOURCE BASE

1. The contribution of new crop, livestock, or fisheries technologies to the increased efficiency in natural resources use and maintenance of long-run productivity.

Innovations will contribute here but again in the second or third technologic generation.

2. The impact of increased efficiency of purchased inputs in crop production on cultivatable lands makes to resource use.

Same as previous answer.

3. The contribution to the preservation, maintenance, and restoration of natural (biological and physical) resources including biological diversity of plant and animal genetic resources.

Innovations will assist in preserving and, in fact, broadening the diversity of biological resources and in stimulating preservation of natural diversity.

4. The potential areas of coverage and the replicability of those improved crop cultivation and livestock or fisheries management practices that contribute to better natural resource use.

Not applicable

5. The contribution that interdisciplinary approaches make to resource conservation and development, agrotechnology transfer, and protection of the environment.

Not applicable.