GLOBAL: POST HARVEST GRAIN SYSTEMS EVALUATION

DAN-4144-A-00-5095-00 - Project 936-4144
AID/DSAN-CA-0256 - Project 931-0/86

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EXECUTIVE SUMMARY

Setting

A three-person team comprised of a direct-hire AID/W professional and two University-based contractors was assembled by Experience, Inc. (EI) at the request of AID/W to evaluate two cooperative agreements between AID and Kansas State University (KSU). The first agreement, AID/DSAN-CA-0256, was effective from September 30, 1980 through February 15, 1986. The second, DAN-4144-00-A-5095-00, was initiated September 30, 1985 and is scheduled to terminate February 15, 1991.

The evaluation team held conferences with FFGI staff at Manhattan, Kansas; USAID/San Jose officials and host-country project cooperators in Costa Rica; USAID/Belize officials and cooperaters in Belize; and reviewed project documents, reports, publications and other materials provided by AID/W, EI and FFGI.

Description of Activity

The cooperative agreements called for FFGI to undertake assistance to LDCs aimed at reducing losses of harvested grain and improving the efficiency of post-harvest systems. Activities undertaken included research, technical assistance, training, operation of a post-harvest documentation service (PHDS), and networking with other post-harvest professionals and operatives.

KSU has had a long involvement in post-harvest activities and is recognized world-wide for its professional expertise in this area. AID has provided funding support for FFGI since the inception of the Institute in 1967, providing the basis for an unusual continuity of professional outreach to LDCs in the important area of post-harvest systems.

Impact: Findings and Analysis

1. FFGI's excellent reputation has been reinforced by the long-term continuity of its activities. Continuity of AID funding has provided the basis for the retention of a highly qualified professional staff which forms the basis for the Institute's outreach activities. However, the erosion of core support occasioned by recent budget reductions threatens to undermine the source of this continuity.

2. Mission buy-ins appear likely to become a major source of funding for FFGI activities. At the same time, the volume of mission requests is potentially highly variable, making buy-ins of limited value in substituting for the more consistent core funding which characterized agreements prior to the one initiated in September 1985.

3. The Institute has had to accomodate mid-project budget reductions on at least three occasions during the course of the present and immediate past Cooperative Agreements.

4. Recent work in Costa Rica and Belize is commendable in its depth of outreach. Such assistance is more likely to acnieve permanent results than more fragmented efforts.

5. Networking activities are important not only to the enhancement of FFGI professional capabilities, but to the capabilities of those with whom KSU staff collaborate. These activities complement the more central activities of technical assistance, training and research.

6. Collaborative efforts between KSU and the various other S&T-supported activities and programs are minimal. Other S&T areas in which post-harvest activities are, or should be, of concern include those of INTSORMIL and the pest-management programs. KSU should also coordinate with the Bureau for Program and Policy Coordination, and the Office of Policy Development and Program Review (PPC/PDPR).

7. PHDS has been making progress toward enlarging both its data base and its service to customers. The prospective development of regional data bases such as the one FAO is pursuing create uncertainties about the most appropriate role for PHDS in the future.

8. Initiatives by FFGI in guiding the privatization of portions of the operations of marketing boards in Belize and Costa Rica are commendable examples of assistance to the private sector. Institute assistance remains, however, very heavily oriented toward public-sector grain marketing agencies.

9. Examples of FFGI success abound in narrative form but they tend not to be well-documented either quantitatively or qualitatively. The Institute has given minimal attention to publicizing its success stories and to establishing an ongoing program evaluation system.

10. The lack of reliable data describing harvesting and in-storage losses in many countries makes it difficult to determine the cost-effectiveness of preventing such losses.

11. FFGI's efforts toward addressing recommendations of the 1984 evaluation team have been commendable, especially in light of subsequent budget reductions it has been called upon to absorb. The earlier review team's recommendatons generally presumed that future funding would grow rather than diminish.

Lessons Learned and Policy Implications

1. An expansion of core funding by AID/W is critical to the future success of FFGI programs. Any further cuts would create extremely serious problems in preservation of a critical mass of technical expertise; PHDS and networking would probably have to be eliminated. Beyond that, the viability of the entire program would be called into question.

2. FFGI is encouraged to seek mission buy-ins and more particularly to seek as much continuity in the funding of its total program activities as is possible. At the same time, AID/W should reevaluate buy-ins as a substitute for core funding in light of the major uncertainties which they create.

3. Further loss assessment studies are needed to establish the size, location and timing of losses and to guide further research aimed at their prevention.

4. FFGI should give further attention to the reporting of its output. It should highlight its successes in case-study examples in its annual reports. It should seek wider publication of research results. It should produce more publications, video tapes and slide-sets oriented to LDC users. It should publish a newsletter for distribution to former students and other post-harvest professionals and practitioners around the world. An ongoing system of internal program evaluation should be initiated.

5. Further attention should be given to the institutionalization of FFGI's outreach activities. In this connection, the team supports the involvement of KSU, Mississippi State University and the Government of Honduras in the proposed international seed and grain center at Zamorano. Such a center might significantly reinforce and expand the research, training and technology transfer capabilities of FFGI.

6. Efforts should be made to form stronger cooperative links with the international agricultural research centers. Such links should aim especially at the strengthening of post-harvest considerations in the CGIAR crop breeding programs.

7. Increased cooperation between S&T-supported activities at KSU and certain other S&T projects and programs might improve efficiency with which all of these various activities are carried on.

8. PHDS is encouraged to continue expansion of its files and extension of its outreach. Means for cooperation rather than competition with the proposed FAO documentation system should be explored.

9. Further opportunities for private sector assistance should be pursued.

10. Increased funding, especially of core-supported activities, is essential to the implementation of recommendations of both the present and the 1984 evaluations.

ACRONYMS

AID	U.S. Agency for International Development
ALAGRAN	Associacion Latinoamericano de Postcosecna de Granos
BMB	Belize Marketing Board
BOA	Basic Ordering Agreement
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIGRAS	Research Center for Grains and Seeds (University of Costa Rica)
CIMMYT	International Maize and Wheat Improvement Center
CNP	Consejo Nacional de Produccion (Costa Rica)
EAP	Escuela Agricola Panamericana (Zamorano, Honduras)
EI	Experience, Inc.
FAO	Food and Agriculture Organization (United Nations)
FFGI	Food and Feed Grain Institute (Kansas State University)
GASGA	Group for Assistance Relating to Grains After Harvest
HYV's	High yielding varieties
IARCs	International Agricultural Research Centers
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRISAT	International Crops Research Institute for the Semiarid Topics
IHMA	Instituto Hondureno de Mercadeo Agricola (Honduras)
IICA	Interamerican Institute of Cooperation for Agriculture
IITA	International Institute of Tropical Agriculture
INTSORMIL	International Sorghum and Miller Collaboration Research Support Program
IPM	Integrated Pest Management
IRRI	International Rice Research Institute
ISGC	International Seed and Grain Center (Proposed for the EAP, Honduras)
KSU	Kansas State University
LDC	Less Developed Country
MSU	Mississippi State University
OICD	Office for International Cooperation and Development (USDA)
PHDS	Post Harvest Documentation Service (KSU)
REDSO	Regional Economic Development Service Office
SEARCA	Southeast Asia Regional Council on Agriculture
S&T/AGR	Science and Technology/Agriculture (AID)
TDRI	Tropical Development Research Institute
USAID	An AID Mission, e.g., USAID/San Jose

I. BACKGROUND ON AID/KSU-FFGI AGREEMENTS 1967 - PRESENT

Since 1967 the Food and Feed Grain Institute (FFGI) at Kansas State University (KSU) has provided assistance with postharvest grain systems to LDCs under a variety of agreements with AID. Since 1980, FFGI has carried out activities under two Cooperative Agreements: AID/DSAN-CA-0256 effective from September 30, 1980 through February 15, 1986, and DAN-4144-A-00-5095-00 which was initiated September 30, 1985 to be in effect until February 15, 1991. A Basic Ordering Agreement (BOA), awarded on April 1, 1986 as a companion to the Cooperative Agreement, enables AID missions to contract on a non-competitive basis for services available from FFGI as a direct result of the research carried out under the Cooperative Agreement. In addition, FFGI provides assistance to a number of LDCs through purchase orders and contracts separately awarded and funded by USAID missions.

Under the agreement with AID from 1967 to 1986, FFGI provided technical assistance, training and information services. FFGI also carried out research to address the unique problems encountered in LDCs during technical assistance and training assignments. The emphasis has shifted, however, in the current Cooperative Agreement to applied research and technology transfer activities which are supported by this core central bureau funding. Technical services are available from FFGI through the BOA with funding provided by AID missions or regional bureaus. These services include project design and evaluation, field testing in pilot efforts, in-country training and demonstrations of new approaches to postharvest systems, and management of agribusiness activities.

II. RESPONSE TO JUNE 1984 EVALUATION

S&T-supported post-harvest activities at Kansas State University have not undergone a formal evaluation since June 1984, when outside consultants reviewed project 931-0786, a precursor to the present project which got underway in September 1985. Inasmuch as the current project has objectives which closely parallel those of the previous one, it is appropriate first to examine responses to the earlier evaluation.

Although the 1984 reviewers offered a number of specific suggestions for improvement, the net thrust of their findings was very positive. They underscored the value of continuity in a successful project: "One of the key assets of the project has been the persistence, building as it has on work which commenced in 1967, of directed activities, a feature not often found in assistance efforts." The reviewers emphasized the professional capabilities of the Institute, commenting that "FFGI's professional staff is highly experienced, capable, motivated to provide first-rate service under the Cooperative Agreement and large enough to constitute a critical mass capable of meeting most project demands without resorting to assistance from outside consultants. Staff resources available for conduct of training and technical assistance are particularly impressive. The staff of the Institute is backstopped by additional capable staff from the various academic departments of the University, including Agricultural Economics, Entomology, Agricultural Engineering and Grain Science and Industry." The earlier conclusions appear equally valid in 1988. At the same time, the 1984 reviewers did suggest a number of changes, each of which is summarized below, along with present reviewers' perceptions of responses to date.

The 1984 reviewers stressed the relatively small size of the effort toward containment of post-harvest losses in the context of its extreme importance, and recommended that AID funding be increased in the future. The annual budget for the follow-on project was, however, even less than the one in effect in 1984, and was cut in 1986 by 18.5 percent and again in 1987 by 13.8 percent. The current funding level is $425,000 per year; the average annual obligation for the previous agreement was $653,400.

The reviewers strongly recommended that a significant research component be added as a complement to ongoing technical assistance and training activities. This recommendation was addressed directly with the inclusion of a $940,000 item for research in the five-year project beginning in September 1985. Based on publications, and information provided to the Evaluation Team, there is, however, limited evidence of increased research output from the new project. There has perhaps not been sufficient time since the new agreement went into effect for most research projects to show major results.

A need was seen for improved lines of communication between AID and FFGI. These links appear to be more secure and effective at the present time.

It was recommended that more emphasis be given to the institutionalization of technology transfer activities, especially training. Specific recommendations were for creation of training materials to enable trainees to become trainers -- lesson plans for short courses, practical publications, 2x2 transparencies, slide/tape sets and video tapes. Institute staff need to work further toward this goal.

The rate of Post-Harvest Documentation Service (PHDS) acquisitions was considered to have been relatively slow up to 1984. The rate increased sharply in fiscal 1984 (1,698 compared with 671 in 1983 and 605 in 1982). The total as of the close of FY 1987 was 9,875, up 146 percent from 4,016 at the close of FY 1983. Acquisitions dropped off sharply in 1987 (785) owing to a decision to enter some poorly documented and difficult-to-classify materials obtained from KSU staff. The suggestion that possibilities for on-line user services be explored has been pursued, but lack of funding prevents serious consideration of on-line systems.

Progress has been made toward improving simultaneous translations for the short course by direct hire of temporary interpreters for each course. The cost is less and the quality of work from hirees who are versed in course topics improved. No progress has been made, however, in extending the French language capabilities of FFGI staff.

The call for a more formal system of ongoing program evaluation has not brought major change. Inclusion of more case-study success stories in annual reports remains a need.

The core staff at KSU continues to grow in experience and in capability. Support from S&T has contributed to continuity in personnel associated with the project. Project administration has done a good job of maintaining, and even strengthening, post-harvest support activities in the face of core support budget cuts and the need, since 1986, to rely on buy-ins for financing support to missions.

Research continues to be a critical need; technology adapted to many specific settings is simply not available. Research capability is limited by the need to seek outside funding for graduate research assistants. The facilitative role played by KSU in organizing loss-assessment research by CIGRAS, and their more direct role in research by CNP in Costa Rica, illustrate the potential for creative cooperative relationships with missions in accomplishing research needs.

The ongoing work with CIGRAS and CNP in Costa Rica and the initiatives with BAB in Belize are good examples of enhanced networking at the country level. The proposed involvement with ISGC at the Escuela Agricola Panamericana (EAP) in Honduras would provide the potential for a much wider geographic scope of cooperation. Aside from the important collaboration in GASGA, remaining networking relations are largely informal and limited in scope. CGIAR ties remain weak; little post-harvest work is apparently underway at the international centers and there is a clear need for interchange of ideas and information which might encourage greater attention to post-harvest needs in the larger focus of center research activities.

The suggestion that more attention be given to the needs of the private sector has apparently been a difficult one to follow. FFGI technical assistance and training activities continue to be directed heavily toward the public sector. It is noteworthy, however, that recent initiatives in Belize and Costa Rica involve assistance aimed at transferring important functions of these nations' government marketing boards to the private sector. Research work tends to be directed relatively more toward private needs; the CIGRAS on-farm loss assessment study is an example of research with direct private sector implications.

The recommendation that microcomputer usage be expanded has been heeded on several fronts. Microcomputer programs have been produced for use of overseas clients. Computerization of LDC government grain marketing policy and programmatic decisions is being encouraged and facilitated by mission buy-in activities. Portable computers are being put to good use by FFGI staff in both training and technical assistance work.

Initiatives by the Department of Agricultural Economics to strengthen the integration of FFGI personnel into the faculty of the Department are commendable. Seminars by Institute staff, their encouragement to participate in departmental affairs, and the development of a new promotion track keyed to the unique duties of FFGI staff are all moves in the direction of improving FFGI interaction with other components of the university and of raising its visibility across the university community.

Little has been accomplished since the last evaluation in cementing ties with previous trainees or with graduates of academic programs. Somewhat more is known of the current status of degree graduates than of trainees. No newsletter or other formal periodic communication has been developed.

The suggested need for more and improved measurement of post-harvest losses has been addressed directly in the context of Costa Rica in the work with CIGRAS (on-farm storage) and CNP (marketing board level). The loss picture on a worldwide basis is still very poorly defined, however.

A delay in the transfer of physical research facilities to a new site on Kimball Avenue in Manhattan, KS was a concern of the earlier evaluation team. The move has not yet been accomplished, and the fragmentation of these facilities continues to be a source of inefficiency.

While progress toward achievement of the improvements called for by the 1984 review team has been mixed, it must be recognized that the team also made a plea for enhanced funding for Institute activities. Since the recommendations generally called for an increased level of services and since the budget has been reduced rather than enhanced, it is not surprising that some of the recommendations remain to be implemented.

III. FINAL ASSESSMENT OF 931-0786

A rigorous assessment of the five-year project which was completed in February 1986 is complicated by the multiplicity of project activities, by the 37 percent cut in the overall budget beginning in 1983 (with no accompanying revision in the logical framework or to the scope of work in the Cooperative Agreement), by difficulties in quantifying outputs specified in the logical framework, and by the lack of previous in-depth studies of project effectiveness.

While the inputs to the project appear, for the most part, to have been applied appropriately and efficiently, measurement of the extent to which the overall goal of reducing post-harvest losses of grain has been achieved is simply not possible. Neither baseline nor post-project loss studies are available. Some intensive measurement activities were initiated in cooperation with the University of Costa Rica (CIGRAS) during the life of the project, but the results are not yet available.

Narrative reports suggest that conditions are improving in some countries such as Honduras and the Philippines. Close FFGI contact over time with marketing boards in some countries provides case-study examples of apparent improvement in their operations; CNP in Cost Rica and IHMA in Honduras are examples of public sector enterprises which appear to have benefited from FFGI support.

Tracking of progress is complicated also by the lack of an effective system for monitoring the career developments of former trainees. The extent to which trainees continue to hold positions in which their training can be applied is generally not known. Turnover may have reduced the ranks of the trained in other countries as it apparently has of Costa Rican CIGRAS employees.

The original budget for this agreement was $5,613,703; final obligations totalled $3,529,777, a 37 percent reduction in funding for the programmed level of activities. Research was a major casualty of this budget reduction and the output of this activity should be viewed with this in mind. Research accounted for 15 percent of person-days under this agreement. Measurement of research output is always a somewhat subjective matter, but is even more so here in light of the unknown amount of complementary support for research from outside the agreement. Aside from counting and evaluating the publications emanating from the agreement, there is no good way of assessing the impact of research. Assessment is further complicated by the fact that research is an important complement to technical assistance and training functions. FFGI's list of "research activities" (98) is much longer than the list of publications (9 "research," 2 "special" and 9 "other" reports), suggesting overzealousness in the tabulation of "activities" or rather low output per activity in the simple sense of publication numbers. Their reporting system offers no insights into the nature of "other publications", a category which apparently includes all that are not published in-house. Citation procedures need to be more complete.

The collection and dissemination of information and training materials accounted for 11.4 percent of the person-days. The production of reports (the research-oriented reports noted above, along with 25 "technical assistance" reports) was an important part of this activity. A total of 2,914 of these various reports were distributed over the life of the project. Some 108 requests for technical information were filled. Institute staff held on-campus discussions with 142 visitors from 40 countries. PHDS grew during the project life from 2,740 to 8,125 documents, an average of 1,077 per year. The number of documents requested varied from year to year, averaging 3,569 annually.

Training, at 31.4 percent of the total, was the largest single budget item. On-campus training alone was 24.2 percent of the total. The annual summer short course attracted 145 participants from 48 countries. Another 10 specialized short courses had 81 participants from 20 countries over the life of the project. In-country training had a much wider outreach, with more than 700 participants being served by 29 programs in 19 countries. Degree programs attracted 61 graduate students to the campus. Short course evaluations indicate trainees were generally well satisfied with the courses they took. The lack of a program for tracking the career progress of former students precludes assessment of the permanence of the effects of this training. Lesson plans suggest the appropriateness of topics pursued in the short courses. There seems no reason to doubt the efficacy of KSU graduate programs.

The loss of OICD funding in support of future summer courses was unfortunate. The team suggests that dialog between KSU and OICD be reopened in the hope of resolving the impasse.

Technical assistance consumed 16.1 percent of the time allocated to this agreement. One long-term assistance program in the Philippines, in support of SEARCA, was in place until the 1983 budget reduction. Short-term assistance saw 17 FFGI staff members and 10 consultants complete 60 assignments in 42 countries. The persistence of requests over time suggests that the assistance was highly valued. It is apparent, as well, that the staff members involved in the work are enthusiastic, dedicated and professionally well-qualified.

FFGI participated regularly over the course of the project in the proceedings of GASGA. Commitment to this required activity appears to have been competently discharged. Other networking activities were generally less structured, involving, for the most part, contacts at professional meetings and on the campus in Manhattan.

The Costa Rican agreement is a good example of cooperation in research and in the exchange of students and information. The ongoing activities with CIGRAS and CNP provide a post-harvest emphasis which is lacking in most countries as well as a potential for spillover benefits for the region. Two Costa Rican students took post-graduate degrees at KSU, one in Agricultural Engineering and one in Grain Science. In July 1985, an in-country workshop on bean storage and hardening problems enrolled 32 Costa Rican participants. Three networking visits were made to Costa Rica between July 1985 and January 1986 to organize collaborative research activities with CIGRAS.

IV. PROGRAM DESCRIPTION OF CURRENT PROJECT 936-4144

A. Description of FFGI

FFGI is part of the Department of Grain Science and Industry at KSU and directs and coordinates multidisciplinary projects related to postharvest grain systems. Through shared appointments of its staff members, FFGI has direct contacts with the Departments of Agricultural Economics, Agricultural Engineering, Entomology, and Grain Science and Industry. Three current FFGI staff members are tenured faculty while the rest are on annual appointments. Much of the training and research is carried out by FFGI staff in their respective departments in various locations throughout the campus. FFGI has a director as well as a coordinator of operations.

FFGI has access to the facilities of the Grain Science Department which include a milling complex for both food and feed grain processing, a bakery facility and research laboratories. The American Institue of Baking and the USDA Grain Marketing Research Laboratory are located near the KSU campus and complement the FFGI activities.

B. Program Components

The program supported by AID was redesigned in project 936-4144 to place more emphasis and core funding in the area of applied research and also to support activities in technology transfer, training, and network building. Technology transfer includes publishing and disseminating research reports and instructional materials, demonstration of research results, collection and dissemination of postharvest documents, and problem-solving technical assistance. A relatively new AID policy was introduced in the form of providing a mechanism for AID missions to access the technical expertise of FFGI quickly and without the requirement for competitive bids. This is known as the buy-in provision wherein USAID missions are expected to pay for the services acquired from the centers of expertise which have been developed and maintained by AID central bureau, or core funding. A basic ordering agreement has been established to complement the Cooperative Agreement, and delivery orders are issued against the BOA for services and training as specified by AID missions. (See Chapter VI for further discussion of buy-ins.)

In the original budget for AID's contribution to the Cooperative Agreement, 29 percent of the funding was planned for research, 39.5 percent for technology transfer, 15 percent for training, 5 percent for network building, and 11 percent for administrative support.

C. Funding Levels

The project and Cooperative Agreement were budgeted at $3,245,000 as AID's total funding for five years. Based on obligations to date, and assuming no further reductions in the AID funding level, $2,245,000 will be the actual AID funding level, a 30 percent reduction from the programmed level.

According to the 1987 Annual Report, the number of person months has been reduced 30 percent from planned levels. According to expenditure figures for 1987 made available to the evaluation team, 36 percent of expenditures were for research, 31 percent for technology transfer, 17 percent for training, 4 percent for networking, and 12 percent for administrative support. These percentages remain close to the planned levels, but the differences between planned and actual budget levels for research and technology transfer reflect the trend to provide services to the missions almost exclusively through buy-ins.

V. EVALUATION OF COMPONENTS

The Cooperative Agreements were developed in response to recommendations made by the GAO and the U.S. Congress to provide funding to reduce post-harvest grain losses in the LDCs. It was assumed that the cost of increasing grain production is much greater than the cost of preserving it after harvest. The present agreement was designed to provide a balanced combination of 1) research, 2) technology transfer, 3) training, and 4) networking. The agreement provides for the services of specialists with expertise in grain loss assessment, grain quality preservation, stored product entomology, mycology, food plant sanitation, storage facilities design, grain drying, processing and milling, and grain marketing. Although it is difficult to quantify the impact of the various components, there is qualitative evidence of significant accomplishments. FFGI might profitably give more attention to highlighting some of its success stories.

A. Research

Of the four project components, research appears to have been the weakest within the first Cooperative Agreement, AID/DSAN-CA-0256 (931-0786). The final report lists only nine research reports and three paper presentations. The research was of a very applied nature and was directed towards providing short-term solutions to problems in post-harvest grain systems in the LDCs.

The second Cooperative Agreement (DAN-4144-A-00-5095-00) (936-4144) calls for research of an applied or adaptive nature to be conducted under actual or simulated LDC conditions. Activities are to be in the following areas:

- Development of cost-effective methods for drying, conditioning, handling, storing and processing of cereal and legume grains in the humid and arid tropics. Special emphasis is on the use of non-fossil fuels in grain drying and on small farm storage structures.

- Development of grain quality preservation practices applicable to LDC conditions, to include pest ecology; IPM strategies involving botanical pesticides, predators and chemicals; grain quality determination in storage and storage technology.

- Applied research in marketing systems to include pricing and marketing policy effects on small farmers and businesses.

Some 28 percent of total staff time was spent on research in 1987. There appears to be an increase in the amount of research being conducted through the second Cooperative Agreement in comparison to that under the first Agreement. There is no evidence yet of a similar increase in research publications. However, insufficient time has elapsed since initiation of the new Agreement for major output to begin appearing.

The 1987 Annual Report lists 12 research projects in grain storage and handling and four topics in grain marketing. The evaluation team, however, questions whether some of the projects should properly be termed "research." Some might more appropriately be labeled "technical assistance." The project, "CIGRAS Evaluation and Formulation of Post-harvest Grain Loss Reduction" in Costa Rica, is such an example. Other topics are described in general terms and have, in fact, appeared as research "topics" throughout the years. Nine research activities are reported as completed in 1987, but none is listed as a research report, although four of the titles are listed as special reports.

The increase in research activities has occurred in spite of reductions, in FY 1986 and 1987, in the FFGI budget. It is evident that much of the research is being funded from non-FFGI sources and conducted by graduate students and FFGI staff in the four respective academic departments.

The grain loss study in Costa Rica is partially completed. It is being conducted by CIGRAS and by CNP in collaboration with FFGI and involves storage in CNP plants as well as on-farm storage. It is important to determine where and when losses occur as well as their extent so that decisions can be made as to the cost effectiveness of developing technology for their reduction. In Costa Rica, a shift in marketing responsibility from the public to the private sector will likely increase the amount of grain stored on the farm. Prices will fluctuate depending on supply and demand, at least within some range, and it will probably pay farmers to dry and store part of the grain in anticipation of higher prices. The increase in on-farm storage will require more knowledge of appropriate ways to reduce storage losses.

Results of the first phase of the loss project conducted by FFGI and CNP are reported in FFGI Research Report No. 28. Dry matter losses in the La China and Terraba plants during the dry season were only 1.7 and 0.3 percent respectively. However, aflatoxin levels were high. Losses at La China were attributed primarily to insect infestation (flour beetles and weevils). These losses appear to be much lower than expected in the tropics and, in fact, unreasonably low. The wet season study, yet to be conducted, may yield different results.

The size and quality of the research program must be increased if FFGI is to provide long-term solutions to problems and if it is to remain competitive in bidding on "buy-ins" through the Basic Ordering Agreement (BOA).

The nature of the research being conducted by FFGI creates potential conflicts as staff work toward promotion within their respective academic departments. It is important that staff members have opportunities to conduct research and to publish their results in appropriate outlets if they are to achieve graduate faculty status and direct graduate student research. At the same time, the unique nature of their responsibilities should be taken into account by the heads and faculties of the respective departments when FFGI staff are considered for promotions.

The temporary nature of the appointments of most of the FFGI staff does not bode well for attacking long-term research problems. The Cooperative Agreement has in the past provided some semblance of job security for the FFGI staff, but recent cuts have threatened even the medium-term security. The "buy-ins" are a means of increasing FFGI funding, but their unpredictable nature and short terms provide even less stable funding than the Cooperative Agreement. If longer-term research is to be undertaken by FFGI, more stable funding support for both staff and graduate assistant must be provided for in an increased budget.

Lack of proper citation of research results in the final report for Agreement 931-0786 and in annual reports for 936-4144 and lack of time available to the team for an indepth review make it difficult to assess the scope and quality of the research program. Only 27 research reports are listed for the 15-year period, 1972-1986. The evaluation team was not made aware of any peer-reviewed articles which have been published during the life of the project.

B. Technology Transfer

The Project Data Sheet calls for (1) the provision of problem solving assistance to the LDCs and (2) information dissemination via the PHDS.

1. Technical Assistance

The FFGI provides expertise to LDCs aimed at helping them solve problems involving post-harvest grain systems. The BOA was developed as a companion instrument to the Agency's Cooperative Agreement No. DAN-4144-A-00-5095-00 to provide support for KSU's technical assistance activities. The BOA provides a mechanism through which USAID Missions and LDC governments can purchase technical assistance services from KSU under the Cooperative Agreement. The estimated cost of delivery orders issued during the term of the BOA is $2.4 million.

Since the initiation of the second Cooperative Agreement, FFGI staff have been involved in 25 technical assistance assignments: Belize (11), Bolivia (3), Chad (1), Guinea Bissau (1), and Pakistan (9). Technical assistance to Belize, as an example, has involved the restructuring of the Belize Marketing Board (BMB) and the rehabilitation of BMB facilities at the rice mill in Toledo District. A technical assistance activity was carried out in Belize in 1987 under the Cooperative Agreement, which allows limited problem-solving assistance for countries. According to the 1988 work plan, all technical assistance is planned with mission funding due to reduced core funding.

The computerized grain marketing policy analysis procedures developed by FFGI represent a major research accomplishment, are presently a major technical assistance initiative, and are unique in their ability to provide straightforward answers to complex problems. The approach is rigorous in terms of its ability to provide quantitative answers from large data sets. The approach is demanding as well in its requirement for detailed and accurate data inputs. It is also rigorous in its implementation requirements; well-trained staff must be in place if the system

is to be integrated into a client country's ongoing policy making process.

Because of the foregoing demands, the computerized approach to policy analysis is not well-suited for use in the poorest LDCs where data are scarce and unreliable and where well-trained staffs are rarely found. More expedient assistance techniques are called for in such countries. Here especially, a narrow but rigorous approach may not necessarily produce better policy results than one which is more comprehensive but less rigorous. Broader government policy initiatives respecting monetary and fiscal matters, currency exchange rates, input pricing and the like may have more significant welfare implications when taken together than do the narrower marketing policy alternatives alone.

The evaluation team discussed the nature of the FFGI technical assistance provided Belize with the Belize Mission and the General Manager of the BMB. The Mission Director and the Agricultural Development Officer termed the performance of FFGI excellent and praised the level of expertise of FFGI staff. The FFGI staff are highly appreciated by the Belizeans as well. The BMB General Manager reported that the KSU technical assistance was the most effective assistance the Board had received. She stressed that KSU technical expertise was of uniformly high quality and that KSU scientists worked closely with BMB officials in the development of proposals that were adapted to the reality of Belizean conditions. The help given to the staff at the Toledo Rice Mill has greatly increased the morale of BMB staff and has resulted in a much better product and a more cost-effective operation. Based on the evaluation team's observations at the mill, the General Manager's assessment is appropriate. Her only suggestion for improvement was that KSU staff should spend more time in Belize, as their level of accomplishment could then be even greater.

2. Post-Harvest Documentation Service (PHDS)

Funding for operation of PHDS provided for in the first Cooperative Agreement was continued in the second Agreement. The Project Data Sheet for the second Agreement calls for a significant increase in the system's capacity. PHDS collects, stores and disseminates information on all aspects of harvesting, storing, processing, marketing and utilization of grains and legumes, with the objective of reducing post-harvest food losses. Subjects included in the collection are:

- o Harvesting and post-harvest losses
- o Stored products pests and storage losses
- o Grain conditioning and drying
- o Grain handling and processing
- o Grain storage facilities
- o Grain marketing
- o Grain utilization and nutrition

PHDS is providing a unique service which is highly beneficial to LDCs and not available elsewhere. Steady progress has been made since its inception in 1981 in increasing the number of acquisitions and clients. Number of documents requested has varied from about 3,000 to 4,000 per year.

PHDS Total Acquisitions and Clients, End of FY 1987 and February 1988

	FY 1987	Feb. 1988
Total acquisitions	9875	12,000
PHDS Clients	729	1,141

Lists of available documents are regularly updated and are sent to clients on a quarterly basis. Documents are provided free of charge to LDCs. More than 400 documents are currently requested per month. The Department of Entomology collection on stored grain entomology, consisting of 7,000 items, is currently being incorporated and another 2,000 documents on post-harvest pest problems will be obtained from the USDA Grain Marketing Research Laboratory.

A decision has been made not to go on-line with PHDS services, but to distribute diskettes with database information to LDC customers. The customers can then search the database locally and submit requests for documents to PHDS.

The KSU PHDS coordinator is currently assisting Pakistan in establishing a PHDS of its own and is providing microcomputer software. The PHDS coordinator will demonstrate the use of the KSU system at the ALAGRAN meeting in Mexico. A decision by FAO to develop its own Asian regional post-harvest documentation service would seem to represent duplication of the effort at KSU; means should be explored for cooperation of the two services.

PHDS provides an extremely valuable service and its expansion should be encouraged. It is expected that the number of clients will continue to increase as the service is publicized and, accordingly, that the number of documents requested will increase. The team recognizes the difficulties involved in incorporating additional documents, but strongly believes that the files should be increased significantly to provide a better representation of the available literature on the subject.

C. Training

Training is an important component of the second Cooperative Agreement and includes activities both at KSU and in-country. In FY 1987, 11.7 percent of total staff time was devoted to on-campus training and 2.4 percent to in-country training, compared to 24.2 percent and 7.2 percent, respectively, during the five years of the first Cooperative Agreement.

On-campus training at KSU consists of (1) academic instruction at the M.S. and Ph.D. level, (2) the Grain Storage and Marketing Short Course, and (3) special short courses and programs produced on demand. In-country training is aimed at solving specific problems and consists of short courses and less formal, hands-on training in procedures involved in grain handling and marketing.

The impact of the training program on LDCs is of course difficult to quantify. FFGI has attempted with some modest degree of success to identify the location and positions of students who have received post-graduate instructions at KSU from 1984 to present. During this period, 13 students received advanced degrees in Agricultural Economics, 11 in Agricultural Engineering, six in Entomology, and 12 in Grain Science (see Appendix 4, number 12). Graduate students have come from 17 countries around the world, including Central and South America, Africa and Southeast Asia. These former students often hold important government positions in their home country and appear to be making good use of their U.S. education.

There are currently 19 students from 13 countries pursuing advanced degrees in academic departments with Institute ties. In observing the research in stored grain entomology being conducted by a Sudanese student, it was evident that the FFGI graduate advisor had provided a dissertation problem which fairly well simulated conditions in Sudan and that the results would be applicable in Sudan. If the other students are similarly guided, their FFGI advisors are to be commended.

A total of 205 students completed the on-campus summer short course from 1981 to 1987:

FFGI Summer Short Course Enrollment, 1981-87

1981	1982	1983	1984	1985	1986	1987
25	24	24	37	35	27	33

Special short courses have been given at KSU and in-country; eleven special short courses were conducted from 1980 to the present. Three of these have been devoted to the large grain borer Prostephanus truncatus which is a new grain pest in several countries including Costa Rica.

No information was provided to the team regarding the current positions of students who have attended either short courses or special courses, making it difficult to appraise the impact on the trainees. However, the team had the opportunity to meet some of the former academic and short course graduates in Costa Rica and Belize and obtained first-hand accounts of their impressions of the training and saw the impact they were having on grain storage and marketing in their countries.

Former academic trainees at KSU are now in extremely important positions in Costa Rica where they continue to be directly involved in grain handling and marketing. Javier Flores is Executive Director of the CNP; D. Benavides is Chief Engineer of CNP; Miguel Mora is Director of CIGRAS; M. Zeledon is Assistant Professor of Agronomy, CIGRAS; and R. Jimenez is an Engineer at CIGRAS. By virtue of their current positions and responsibilities, it is apparent that the academic training of these individuals is having a favorable impact on Costa Rica.

The only two Belizeans trained at KSU attended the short course in 1987. Jimmy Bordales is Manager and Dean Foreman is Miller at the Toledo Rice Mill. Both of these individuals speak very highly of the training received at KSU. They report that what they learned was useful when they returned to Belize. They found the tours to be very enlightening, as they were able to see how U.S. rice mills are operated. Upon return to Belize, they made changes in their mills based on their training and observations in the U.S. Their KSU training has been enhanced by the frequent visits of FFGI staff who have provided continued on-the-job training at Toledo. These trainees stress that they can now solve many of their own problems without resorting to the help of FFGI staff.

D. Networking

The networking system is designed to promote collaborative research, technology transfer and training with national and international institutions involved with post-harvest grain systems in LDCs. Networking provides opportunities for FFGI to establish linkages with institutions in LDCs which are responsible for research, training, and technology transfer. Of the four program components, the least staff time is devoted to networking. In the first Cooperative Agreement (1980-1986), 1.6 percent of the time was spent in to networking, while in FY 1987 only 0.7 percent of total time was given to this activity.

The FFGI has maintained its participation in GASGA activities and continues strong linkages with the CNP and CIGRAS in Costa Rica. The revised Scope of Work calls for FFGI to establish linkages with IARCs and the Regional Economic Service offices, including REDSO and ROCAP.

A major networking activity involving the development of an International Seed and Grain Center at the Panamerican school EAP in Zamorano, Honduras has been proposed. Funding is currently being sought. The proposal calls for a center that will link the pre- and post-production phases of the food chain. The proposed program involves Mississippi State University (MSU) in seed technology and KSU in post-harvest systems. The center would serve the needs of Central and South America in terms of applied research, training, technology transfer, and technical assistance.

The evaluation team is supportive of this effort and believes that both universities are highly suited to undertake the project. The shifting of more activity to the LDCs is a logical expansion of the KSU program and the goals and objectivies of the center are clearly in agreement with the mandate of the FFGI. EAP has an excellent reputation training in agriculture and would provide an ideal LDC site for the proposed activity.

The FFGI staff report that the IARCs have shown little interest in post-harvest considerations and are conducting very little research on the storability of modern grain varieties. They contend that breeding programs at IARCs place little emphasis on the implications of the release of HYVs which are more susceptible to storage problems than are the traditional varieties. An example is the release of a maize variety in Kenya which was so susceptible to storage insects that it failed to gain local acceptance. IARCs with crop breeding programs offering the potential for useful linkages include IRRI, ICARDA, IITA, CIMMYT, ICRISAT, and CIAT. Linkages with CIMMYT have led to the inclusion of breeding line evaluations for susceptibility to maize insects. Closer linkages with these centers would be mutually beneficial to both the center and FFGI programs.

Present networking activities appear to be providing a payback that is beneficial to the FFGI program. FFGI should continue seeking additional linkages. There is unfortunately little cooperation among the various national and international institutions concerned with post-harvest systems. Closer linkages with agencies such as TDRI would seem beneficial. In addition, FFGI should publish a newsletter on a regular basis to maintain closer ties with national, regional and international institutions. The on-campus and international activities of FFGI would readily provide the basis for a newsletter. The newsletter would provide a forum for KSU to highlight some of its success stories and for gaining favorable publicity.

VI. BUY-INS

A. Current Status and Description of Activities

Basic Ordering Agreement (BOA) DAN-4144-B-00-6002-00 is a 5-year agreement between AID and FFGI which is a companion instrument to the Cooperative Agreement. It provides a mechanism by which USAID missions in developing countries can contract for the services of FFGI to carry out activities related to post-harvest grain systems in the areas of applied research, technology transfer and training. Missions as a group are allowed to spend up to a total of $2.4 million ($0.5 million annually) with each delivery order at a minimul level of $25,000.

Research activities include collaboration between FFGI staff members and LDC research agencies. Technology transfer includes the development and dissemination of training manuals, feasibility and market studies and evaluations for improving post-harvest grain systems. Training activities include special short courses on-campus and in-country seminars and workshops.

Three buy-ins were negotiated and carried out in FY 1987; one for technology transfer in Belize and two for in-country training programs in Panama and Sudan. The scope of work for the buy in from Belize provided technical assistance in restructuring the Belize Marketing Board (BMB) and for assisting BMB in developing a price stabilization program suitable to the country's needs.

In Panama personnel were trained in the management and operation of three silo facilities located in San Pablo, La Honda, and Santiago. A request from USAID/Khartoum calls for training in warehouse storage. In FY 87 the Belize buy-ins required 98 person-days and the Panama buy-in 21.5 person-days.

B. How Implemented

Services may be obtained by the missions in one of two ways:

1. For assignments costing less than $25,000, the mission issues a purchase order directly to FFGI. Competitive bidding is not required.

2. The USAID mission prepares a PIO/T and submits this request for services to the AID/W project officer who reviews and clears the request and then transmits it ot the appropriate contracting officer in AID/W. The Contracting Officer then requests in writing a proposal for the work to be performed from the university. The university provides the contracting officer a detailed cost proposal within 10 working days of the request for proposal.

After finalization of negotiations, the Contracting Officer issues a delivery order for the services. Under this BOA, each delivery order must be a minimum of $25,000. Each delivery order specifices the service to be performed, the required level-of-effort, the period of performance, amount of obligated funding, and the budget for the activity. Funding obligated under one delivery order may not be used to supplement funding of any other order.

The technical assistance services provided through the BOA provide the opportunity for KSU to field test activities carried out under the Cooperative Agreement. The specific services - which may include long and short-term technical assistance, training, and advisory activities - are described in the BOA.

C. Impact on Program

The Basic Ordering Agreement establisning the buy-ins has given FFGI a means to provide external technical assistance and special training. It has also afforded a means to cope with the reduced funding available from central AID/W budgets. If the buy-ins increase as hoped, there may be a shortage of manpower needed to handle the work and some requests will have to be refused. The alternative is to hire more FFGI staff or contract the work out to consultants. The unpredictability of buy-in funding may make it difficult to plan the hiring of additional FFGI staff needed to service the buy-ins.

D. Problems/Issues

In spite of the potential for a significant number of buy-ins from AID missions and the aggressiveness of the FFGI, the missions have not fully utilized buy-ins. This lack of activity on the part of missions has occurred in spite of a cable that was sent to all missions in April 1985 describing the research, training, technology transfer and networking that is provided under the BOA. Continued awareness building on behalf of FFGI is necessary in order for the Institute to increase its level of buy-ins.

VII. BENEFITS FOR U.S. AGRICULTURE

The view of many U.S. citizens that foreign assistance activities such as are undertaken within the Cooperative Agreement between S&T/AGR and KSU are detrimental to the interest of U.S. farmers is mistaken. The KSU programs, perhaps more than most assistance, are motivated by expectations of benefits to the U.S. as well as by altruism. Greater world security may be the most important benefit; greater economic security for the peoples of the less developed nations can only enhance the prospects for peace.

The exchange of ideas and experiences is the very heart of this project. Foreign students receive training and post-graduate education at KSU. They visit American farms, businesses and government agencies. Americans from KSU work side by side with the citizens of scores of many nations in overseas training and technical assistance. It is apparent that an enormous amount of good will is generated in the process--good will for America and a better understanding by others of Americans.

Certain farm groups have argued lately that foreign agricultural assistance programs reduce U.S. markets in the less developed world and create potential competition in other overseas markets. This view too is mistaken in both theory and practice. Several former recipients of U.S. agricultural assistance, including South Korea and Taiwan, now rank among our best customers for agricultural exports. The theoretical basis is clear. First, agricultural assistance is an appropriate emphasis in programs aimed at improving average LDC incomes and at reducing disparities in income distribution. Agricultural production and post-harvest activities are relatively labor-intensive, providing, as a result, significant employment opportunities. The additional income resulting from more efficient methods of grain handling and storage will support further employment in other sectors of the economy. Since purchases of food are extremely sensitive to increases in incomes in the poorest countries, a large proportion of the marginal income generated by the growth in employment will be spent for food. Many of the LDCs, given their narrow range of resource endowments, will be unable to meet the resulting rapid growth in food demand and will be forced to increase their imports of food grains. As incomes continue to grow, changing diets will lead to an even more explosive growth in demand for feed grains.

The KSU project contributes to enhancement of employment and incomes by improving the quality (and value) of grain and by reducing the costs of marketing. KSU programs are aimed at seeking out appropriate technologies for post-harvest activities, technologies which are likely, in most LDC settings, to be relatively labor intensive and thus to generate the kind of income growth and distribution favorable to rapid expansion of food demand.

In the shorter term, certain of the Institute's post-harvest activities are aimed at enhancing the efficiency of utilization of U.S. PL-480 grain shipments and thus their value to recipients. The PL-480 shipments not only relieve U.S. grain surpluses which would otherwise serve to depress prices to U.S. farmers, but when properly integrated into development programs, contribute as well toward growth of employment and income in recipient countries. The eventual result is a potentially rapid expansion in demand for commercial food imports.

Some of the research undertaken by FFGI results in findings applicable to developed as well as less-developed agricultural settings. Much of the work oriented toward public sector storage and marketing problems is of this nature. Improved loss assessment techniques, another example, are likely to have application to U.S. as well as LDC environments.

KSU contacts abroad and overseas visitor contacts at KSU serve to acquaint foreigners with U.S. grain, grain products and grain handling and storage equipment. Such contacts lead to trading opportunities to the benefit of U.S. farmers and agribusinesses. In addition, U.S. contractors and suppliers whose services and products are utilized in the research and outreach programs of the Institute benefit directly and immediately.

Experience gained in controlling foreign insect and disease pests of stored grain can be extemely valuable to foreign assistance professionals at KSU and to American agricultural interests should these pests reach U.S. shores.

VIII. CURRENT STATUS OF PROGRAM

A. Staffing Level

The current staff of FFGI are, for the most part, those identified by AID as key personnel in the documentation which justified the selection of FFGI to carry out a program in postharvest grain systems. There is no longer, however, a grain storage mycologist on the staff.

The five-year activity was planned on the basis of AID support for 152 person-months per year, but this has been reduced due to funding reductions to approximately 104 person months annually (as reported on page 36 of the FY 1987 annual report). This represents a reduction of approximately 33 percent which reflects the one-third reduction in the planned budget levels.

As a result of its recent experience with the BOA, FFGI has concluded that the current staff level is not sufficient to meet the requirements of both the Cooperative Agreement and delivery orders issued under the BOA. An agricultural economist will be hired shortly, and the Institute is discussing additional needs in the economics and storage areas with the University. Retirements anticipated over the next two to five years will undermine the invaluable resource of experienced, dedicated personnel. Steps need to be taken at this time to plan for future recruitment. French language capability might be one of the qualifying criteria for any new personnel.

The FFGI assessment of additional staffing requirements supports the finding of this evaluation team that further reductions in AID core funding from the Cooperative Agreement will substantively alter the scope and objectives of the Agreement. If core funding were reduced in the future, AID and FFGI would have to decide which among the current components would continue and how to reallocate a reduced staff among these components because the current mix of expertise could no longer be funded.

B. Actual Compared to Planned Outputs

The logical framework developed for this project has been modified in accordance with the reduced funding level. Based on outputs accomplished to date and the fact that adjustments have been made, it appears likely that the revised outputs will be achieved by the end of the project. In the technology transfer component, 20 research publications and instructional manuals are to be disseminated. It is not clear if these publications are linked to the research outputs so that the assumption could be made that the 14 research activities will appear as 14 of the research publications.

FFGI explains that the work plan anticipates a shift of personnel between Cooperative Agreement activities and activities under the BOA. It is not clear what implications such a shift will have on accomplishing the objectives of the Cooperative Agreement.

On page 43 of the FY 1987 Annual Report, FFGI states that it has exceeded budgeted targets for staff time spent on activities funded by the agreement. Table 4, page 59 reports the budgeted time as 91 person months but does not identify the source of this item. The Cooperative Agreement calls for 152.4 person months per year and in fact, elsewhere in the annual report (p.36), FFGI reports 104 months of staff time during FY 1987. If the planned person months were reduced by one-third as was the planned budget, 102 person months would be the level of activity.

C. Funding Levels in Terms of Cost Effectiveness

As mentioned elsewhere in this report, one of the primary objectives of AID's continuing support to FFGI is to maintain their expertise in postharvest grain systems and direct their unique capabilities toward research, technology transfer, and training for the benefit of LDCs. It is fairly difficult, and perhaps inappropriate, to discuss cost effectiveness in terms of comparison because there is no institution or private firm comparable to FFGI in terms of purpose, scope of activities and services provided, and objectives.

There are a few areas of concern, however, in terms of the funding levels being provided and cost effectiveness. According to the FY 1988 work plan, the number of person-months supported by the Cooperative Agreement is nearly the same as the number programmed in the project paper except for the critical graduate students category. The following table illustrates this point:

INPUTS	FY 1988 TARGET (person-months)	PP TARGET (person-months)
Coordinator	6.0	8.4
Economist	19.4	18.0
Engineers	14.0	18.0
Storage Specialists	14.4	14.4
Technical Support	19.2	19.2
Clerical Support	18.0	38.4
Graduate Students	0.0	36.0
	91.0	152.4

The availability of GRAs funded under the Cooperative Agreement is one of the basic assumptions for achieving the objectives of the research program. To the extent GRAs are available from other university resources, a viable research and technology transfer program can be maintained. AID should closely monitor this situation to insure adequate inputs to these program components so that research will be carried out, documented, published, and disseminated.

AID should also determine the program significance of the more than 50 percent reduction in the clerical support input. It is not clear from the documents if additional clerical support is being provided from other sources or if some aspects of the program are receiving insufficient support due to this reduction.

Another area of concern is the PHDS which did not increase its number of document requests in 1987. FFGI states that they have little control over this element. AID and FFGI should monitor this situation to try to determine how PHDS can stimulate demand for its services, which can be influenced by providers of services. If demand continues to decrease, or even level off, AID and FFGI should seriously consider the cost effectiveness of continuing this service in view of competing priorities for limited resources and the availability of comparable documents from other sources such as USDA or the FAO.

Although networking accounts for minor amounts of funds and time, it is difficult to assess these activities when trip reports are not furnished and there is little, if any, description of the accomplishments or impact of GASGA, in particular. The value of the linkages with CGIAR, CNP, and EAP are evident in the continuing activities and programs carried out in collaboration with these institutions.

Any discussion of cost effectiveness has to acknowledge the invaluable contribution of experienced and dedicated staff in terms of expertise, judgment, cultural sensitivity, developmental orientation, and personal time that FFGI staff put into every activity. Obviously, there is no way to calculate the cost effectiveness of this kind of service.

Because so many resources are being devoted to this effort - funds from both AID and KSU, intellectual contributions, and physical structures - the need to document research findings, synthesize these results, assess impact, and develop the capability to assist more African countries is made even more apparent and urgent. The ultimate test of cost effectiveness will be found in the improvement of postharvest grain systems in a greater number of LDCs. The measure of the success of this program will be the degree to which these improvements are instituted and maintained by the countries themselves as a result of the interdisciplinary efforts of FFGI.

D. Constraints to Carrying out Programs

The major constraints to the provision of more and better services by FFGI is the limited budget support for core activities. The S&T funding is absolutely essential to the preservation of a critical mass of professional expertise from which the various obligations of the Institute, including those paid from mission buy-ins, must be met. Buy-in authorizations are no substitute in this regard for obligated core funding. Professional expertise of the sort required to meet the challenging demands placed upon the Institute must be contracted well in advance of need and generally in blocks of at least a person-year at a time. Mission buy-ins provide a weak basis for making such commitments.

KSU has done an excellent job of retaining a high quality staff of reasonable depth in the face of declining funding in combination with a growing work load. This has been accomplished by moving FTEs dropped from core support to state and other program funding as attrition and program changes have permitted. The Institute is now faced with the need, if anticipated demand from missions for BOA-funded support is to be met, to hire additional professional staff from anticipated but unpredictable BOA income.

The Department of Agricultural Economics is now advertising for a senior economist whose salary would be the responsibility of FFGI. There are indications that a second economist could be put to good use.

The retirement of the Institute's mycologist has resulted in a shortage of technical staff with expertise in storage. The problem will become more acute should the work load of the two remaining storage specialists increase through buy-ins. Because core funding is not available to support graduate student research, FFGI staff have been forced to seek outside grant funds to meet their research needs, an extra burden for an already over-committed staff.

A shortage of French language expertise appears to have limited the Institute's ability to provide services to missions in West Africa. Technical support to this region, one of the poorest anywhere, has generally been below the level provided other regions.

The computer modeling approach developed by the economics staff is less capable of providing support to the poorest nations, such as those in West Africa, than to the more advanced LDCs. This constraint, originating in both the shortage of funding and the limited trained staff and data/statistical analysis capability in many of these countries, limits the Institute's ability to provide grain marketing policy assistance to some of the countries needing it most.

The division of FFGI's physical research facilities in Manhattan between two separate sites, a concern voiced by the 1984 evaluation team, remains a concern in 1988. Research activities are carried on less efficiently and effectively as a result. The transfer of remaining structures and equipment from the site on Browning Avenue to the one on Kimball Avenue should be arranged forthwith.

IX. RECOMMENDATIONS

A. Log Frame Revisions in Relation to Projected Funding Levels

The S&T/KSU Cooperative Agreement provides the basis for the maintenance of a critical mass of professional expertise at FFGI. It provides the means by which KSU can meet varying year-to-year demands for the services it holds out to provide to missions and LDC governments. Without the guarantee of employment implied in the Agreement, FFGI would be forced to reduce the size of its staff, as almost all of its budget goes for professional staffing.

Should the Institute be called upon to absorb a further budget reduction, there would be virtually no alternative to reducing staff size, thus jeopardizing the maintenance of a critical mass of expertise in the several interacting disciplines represented. If the present mix of Institute activities is properly balanced, and the evaluation team believes this to be the case, any cut would logically come proportionally from all of the various major activities. Selective reductions might be more destructive since the several activities of the Institute are highly complementary. Technical assistance provides staff experience needed to design and implement appropriate training. Research is the basis for designing appropriate technical assistance, and training provides the foundation upon which technical assistance can be absorbed and institutionalized in recipient countries. The important point, however, is that core funding is already of marginal scope for maintenance of the critical mass needed for retention of an effective program. Having made this important point, should further cuts nevertheless be imposed, the elimination of PHDs and the reduction or elimination of networking activities would seem to be the least adverse response because the multidisciplinary expertise could be maintained.

B. Closer Linkages with Other AID Supported Activities

Post-harvest processes are only a part, albeit an important one, of a much larger system of agricultural production, household and marketing activities. Forces impacting on one part of the system are likely to have repercussions elsewhere in the system. It is thus highly desirable that the various activities undertaken and supported by S&T be recognized as being interrelated and potentially complementary. Grain marketing policy options as evaluated by FFGI in technical assistance initiatives might thus be sharpened by consultations with S&T's economic policy specialists. Technical assistance teams might benefit in some cases by the inclusion of a team member representing another of S&T's areas of support. An environmental specialist might, for instance, complement the activities of pest management specialists in some assistance roles. The Office of Policy Development and Program Review, to cite another example, has contracted with Stanford University for the production of a computerized policy assessment model which is very similar in many respects to the one used by FFGI marketing specialists. The two groups might profit from cooperation in future modeling efforts.

In addition, a number of S&T projects are identified in the project paper as potential collaborators with FFGI to share research results and technical information in order to achieve common objectives. The evaluation team saw little evidence of such linkages and encourages S&T/AGR to facilitate the coordination and collaboration process and KSU to establish working relationship with the institutions implementing these complementary activities.

C. Design Modifications to Improve Efficiency, Cost-Effectiveness, and Impact Potential

1. A more formal means of coordination of FFGI activities with other activities supported by S&T might reduce potential duplication of effort and improve the efficiency of all activities. Coordination within S&T as well as among projects in the field is needed.

2. Continuity of professional staffing requires expansion of core funding for the project. Buy-ins are not an adequate substitute for the more dependable core funds.

D. Relationship to AID's 103 Focus Statement

The Cooperative Agreement is in support of a program which aims at reducing losses of grain already produced, at saving what has been produced rather than producing more. It thus aims at the conservation rather than the exploitation of natural resources. However, the economic emphases of the project are directed toward reducing unit costs associated with post-harvest operations, one result of which will be incentive to produce more grain. The result will be larger amounts of marketable surpluses and, because the demand for basic food and feed grains in most LDCs is relatively elastic, more net income for farmers.

Consumers will benefit from having more food at lower prices. They will benefit nutritionally as well. Since insect damage often affects the most nutritious parts of grains, a given reduction in weight losses will result in proportionally greater nutritional benefits. Containment of molds will reduce levels of mycotoxins, including highly toxic aflatoxins, with obvious and very significant potential benefits for human health and nutrition.

It is apparent that FFGI staff are conscious of the potential risks in certain pest control measures and that they are selective in their recommendations. Some measures, use of phostoxin grain fumigants, for example, are recommended by FFGI personnel only for use by specialists in large-scale storage and not by small farmers.

By assisting in moves toward privatization of certain post-harvest activities as they are doing, for example, in their work with CNP in Costa Rica and BMB in Belize, FFGI staff are helping to encourage and to develop smaller-scale, more labor-intensive activities. The result will be improved utilization of low-cost labor resources, enhanced employment opportunities, a more even distribution of income and a significant resulting contribution toward economic advancement for the country as a whole.

E. Relationship to Concerns of Sustainable Agriculture

Since the thrust of the project is toward reducing waste and thus toward conserving resources, it is highly compatible with the goal of agricultural sustainability. FFGI staff are clearly cognizant of the importance of this issue in their project activities. Research aimed, for example, at enhancing the efficiency of solar grain drying methods supports this goal by reducing reliance on fossil fuels. Research directed toward cataloging and explaining the effects of traditional and natural pest control treatments has potential for reducing usage of possibly harmful chemical applications. Emphasis on sanitation and appropriate management in general can reduce the need for chemical controls and for mechanical drying activities.

X. LESSONS LEARNED

1. Continuity in the financial support of a critical mass of professional expertise is essential to the effective and efficient operation of an outreach organization such as FFGI.

2. Buy-ins are not an appropriate vehicle for project financing when they are used to support a high proportion of the operations of an organization whose major resource base is professional staff.

3. Budget cuts midway through an agreement are difficult to absorb and emasculate the effectiveness potential of the program.

4. A critical mass of assistance aimed at a given country's post-harvest professionals and officials is essential to the insititutionalization of the assistance.

5. Although KSU is a world center of expertise in post-harvest grain systems, it has no monopoly on such expertise, nor the ability to undertake all of the enormous volume of work needed in the area. Efforts should be redoubled to make LDC recipients of assistance self-sufficient in meeting post-harvest needs and to collaborate with professional colleagues in sharing of insights and avoidance of duplication.

APPENDICES

APPENDIX 1

STATEMENT OF WORK FOR EVALUATION TEAM

The evaluation team will:

A. Evaluate the effectiveness of the project in reducing post-harvest losses in countries in which the project has had major activities.

B. Determine if Project Number 931-0780 fulfilled its objectives and if weaknesses in that project have been corrected in the follow-on project 936-4144.

C. Evaluate the effectiveness and appropriateness of the research program and its importance in preventing post-harvest losses and improving processing and marketing in LDCs. Is the research provided cost-efficient in terms of research expense versus economic applicability of the results?

D. Evaluate the effectiveness of the post-harvest documentation service (PHDS) and technical transfer to LDCs, quality of the Post Harvest Documentation Service Center (PDSC), quantity of requests to PHDS, supply of information material, validation, adaptation and testing of technology for appropriateness in LDCs.

E. Evaluate the training programs (short and long-term degree and non-degree) of the project. What are the positions of previous trainees in LDCs and what is their impact?

F. Determine the value of the networking activity of the project which KSU established with LDCs, IARCs, other international organizations, the U.S. and other countries.

G. Evaluate the problem solving services such as quality of project designs, evaluations and studies that the project conducted for missions through the BOA. Do missions effectively utilize the BOA?

H. Evaluate the staffing level of the project. Is the staffing level sufficient to perform all project matters, including BOA requests, in a timely manner? Do direct contract arrangements with missions for implementation of projects affect the workload of the project's personnel to the detriment of the project?

I. Compare the status of present outputs of the project with those for the life of the project. Make recommendations as to how the efficiency and effectiveness of the project can be improved.

J. Consider alternative additional avenues of funding that the project can tap into.

K. Review the potential for closer linkages with other S&T projects as a means to help facilitate technology diffusion.

L. Evaluate the economics of the project. Is present funding sufficient for a significant economical impact of project development? Ratio of contract person days/total project expenditures output. Ratio of trainees/training expenditures to number trained.

M. Evaluate the impact of the project on private enterprise. Did the U.S. private enterprise participate in the development of LDC's grain storage, processing and marketing? Describe the benefits to U.S. agriculture of the project's activities.

APPENDIX 2

PERSONS CONTACTED

KANSAS STATE UNIVERSITY

Charles Deyoe, Director, FFGI
Roe Borsdorf, Agricultural Economist/Coordinator, FFGI
Do Sup Chung, Storage and Processing Engineer, FFGI
Rolando Flores, Grain Storage Management Specialist, FFGI
Kathy Foster, Linguist, FFGI
Ekrammul Haque, Storage and Processing Engineer, FFGI
T.O. Hopkins, Acting Head, Department of Entomology
Cornelius Hugo, Agricultural Economist, FFGI
Marc Johnson, Head, Department of Agricultural Economics
John Pedersen, Grain Storage Specialist, FFGI
Richard Phillips, Agricultural Economist, FFGI
Donna Schenck-Hamlin, PHDS Coordinator, FFGI
Valerie Wright, Stored Grain Entomologist, FFGI

AID/W

Carroll Collier, Pest Management Specialist, S&T/AGR
Frank Mertens, Project Officer, S&T/AGR
Phillip Church, Agricultural Economist, S&T/AGR

COSTA RICA

AID:

William Baucom, Agricultural Development Officer
Frank Heileman, Agricultural Officer
Ross Wittery, Agricultural Officer
Arturo Villalobos, Agri-business Development Specialist

CNP:

Javier Flores, Executive President
Louis Quesada, Manager, Quality Control Laboratory, La China
Maria Munoz, Quality Control Laboratory, La China

CIGRAS:

Miguel Mora, Director
Ron Jiminez, Grain Storage Engineer

BELIZE

AID:

Neboysha Brashich, Mission Director
Stephen Szadek, Agricultural Development Officer
Gilbert Canton, Agricultural Officer

BMB:

Sandra Bedaran, General Manager
Mr. Chan, Assistant to the General Manager
Mr. Simons, Assistant
Jim Bordales, Manager, Toledo Rice Mill
Dean Foreman, Miller, Toledo Rice Mill

Belize Mills (Subsidiary of Maple Leaf Mills, Canada

Michael Fanning, Miller
Raul I. Gomez, Operations Manager

Cayo District, Belize

Leroy Peters, Forage Agronomist, Central Farm, SECID/USAID
John Dueck, General Manager, Reimer Feed Mills (Mennonite Community)

A P P E N D I X 3

Cost Effectiveness of FFGI Components, 1984 to 1987

Component	FY84-USAN-CA-0256	FY85-USAN-CA-0256	FY86-USAN-CA-0255[1/]	FY86-DAN-4144-A-00-5095-00[2/]	FY87-DAN-4144-A-00-5095-00
Info Services-PHDS	$59,874 352 person days 1700 acquisitions 422 clients 4,125 requests for info	$64,295 323 person days 1741 acquisitions 459 clients 3,906 requests for info	$54,026 194.5 person days 670 acquisitions 585 clients 2,921 requests for info	$28,863 212 person days 965 acquisitions 685 clients 2,522 requests for info	$50,000 402 person days 785 acquisitions 829 clients 2,947 requests for info
On Campus Trng. (degree & non degree)	$105,489 2 academic trainees 37 short courses 11 special courses 606.5 person days	$ 91,498 3 academic trainees 35 short courses 24 special courses 440.5 person days	$ 56,031 2 academic trainees 13 special courses 232 person days	$ 32,035 4 academic trainees 27 short courses 232 person days	$ 68,658 1 academic trainee /2 partial 33 short courses 404 person days
Increase & Maintain tech. capabilities research projects	$106,710 31 projects 595 person days	$ 86,867 31 projects 401.5 person days	$175,132 19 projects 588.5 person days	$ 65,020 16 projects 507 person days	$148,666 11 projects 593 person days
Technical assist	$167,100 532 person days 12 assignments average $13,900 per assignment $314 per person day	$246,038 669 person days 20 assignments average $12,302 per assignment $367 per person day	$ 14,144 31 person days 1 assignment $456 per person day	$ 52,753 184 person days 2 assignments $286 per person day	$ 25,569 64.5 person days 3 assignments $393 per person day

1/ 07/01/85 - 02/15/86
2/ 02/16/86 - 06/30/86

APPENDIX 4

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