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FINAL REPORT

Cooperative Agreement AID/DSAN-CA-0256
Improvement of Postharvest Grain Systems

October 1, 1980 - February 15, 1986

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prepared for the

AGENCY FOR INTERNATIONAL DEVELOPMENT
UNITED STATES DEPARTMENT OF STATE

by the

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EXECUTIVE SUMMARY

Activities of the Food and Feed Grain Institute (FFGI) under Cooperative Agreement AID/DSAN-CA-0256 were conducted in six major categories. These categories are technical assistance, in-country training, on-campus training, increase and maintain technical capabilities, information services, and networking activities. The allocation of FFGI staff members' time to the different activity categories is summarized below.

<u>Activity category</u>	<u>Person-Days</u>	<u>Percent</u>
Technical assistance	3,100.5	18.1
In-country training	1,229.5	7.2
On-campus training	4,138.5	24.2
Increase and maintain technical capabilities	2,652.5	15.5
Information services	1,954.5	11.4
Networking activities	281.0	1.6
Administrative support	<u>3,766.0</u>	<u>22.0</u>
Total	17,122.5	100.0

Technical assistance undertaken consisted of one long-term assistance program in the Philippines, and 60 short-term assignments in 42 different countries, involving 17 FFGI staff members and 10 consultants. These assignments addressed various aspects of storage and marketing in the postharvest system for cereal grains and legumes.

FFGI staff members participated in the presentation of 29 in-country training programs in 19 countries. These programs provided training in the area of grain storage and handling to over 700 participants. A total of 13 FFGI staff members and 6 consultants participated in training activities.

On-campus training involved the advising of 61 graduate students pursuing advanced degrees at KSU, the training of 145 participants from 48 countries in the annual Grain Storage and Marketing Short Course, and the presentation of 10 special short course to 81 participants from 20 countries.

To increase and maintain technical capabilities, FFGI staff members worked with 98 research projects in various areas of grain handling and storage and grain marketing. In addition, staff members attended 28 professional or technical meetings to further their knowledge in their fields of expertise.

A total of 25 technical assistance reports, 7 research reports, 2 special reports, and 29 other publications were prepared by staff members. A total of 2,014 reports were distributed and 108 requests for technical information were answered. Staff members also spent time discussing FFGI activities with 142 visitors from 40 countries. The Postharvest Documentation Service increased its number of clients, acquisitions, and requests for documents.

FFGI continued its participation in GASGA, extended its activities with the Centro para Investigaciones en Granos y Semillas of the University of Costa Rica, established linkages with the Consejo Nacional de Producción and the Instituto Interamericano de Cooperación para la Agricultura, and made preliminary plans to establish an agreement with the Escuela Agrícola Panamericana in Zamorano, Honduras.

SECTION I

INTRODUCTION

In October 1980, the Kansas State University (KSU) Food and Feed Grain Institute (FFGI) and the Agency for International Development (AID), Bureau of Science and Technology (S&T) signed Cooperative Agreement AID/DSAN-CA-0256, entitled "Improvement of Postharvest Grain Systems." The final report of the cooperative agreement covers the period October 1, 1980 - February 15, 1986. Annual activity reports were prepared for each fiscal year and are listed in Appendix I. The activity report for the period July 1, 1985 - February 15, 1986 is attached as Appendix II.

The major activity categories under this agreement include: (1) technical assistance, (2) in-country training, (3) on-campus training, (4) increase and maintain technical capabilities, (5) information services, and (6) networking activities.

Activities in the areas of technical assistance, in-country training, and special on-campus training programs were direct responses to mission requests and were aimed at addressing specific needs in postharvest grain systems around the world, and solving problems in host countries. The remaining categories reflect ongoing activities being carried out by FFGI staff members.

The cooperative agreement was originally budgeted for \$5,613,703 in funding from AID. However, the level of obligations was substantially reduced beginning in FY 1983. Total obligations to this cooperative agreement were \$3,529,777.54, with \$262,806.00 of that amount consisting of mission buy-ins which provided funding for technical assistance and training activities for these missions.

Although obligations were reduced below the budget originally set in the cooperative agreement, no alterations were ever made to the scope of work to reflect a lower level of activities resulting from budgetary constraints. As a result, the level of activities detailed in this report can not be compared to the output originally expected in the cooperative agreement.

The allocation of FFGI staff members' time to activity categories is detailed in Table 1. These efforts are summarized below to indicate total time distribution by activity.

<u>Activity category</u>	<u>Person-Days</u>	<u>Percent</u>
Technical assistance	3,100.5	18.1
In-country training	1,229.5	7.2
On-campus training	4,138.5	24.2
Increase and maintain technical capabilities	2,652.5	15.5
Information services	1,954.5	11.4
Networking activities	281.0	1.6
Administrative support	<u>3,766.0</u>	<u>22.0</u>
Total	17,122.5	100.0

Due to the fact that FFGI activities are international in scope, language translation and interpretation services are often required. In the performance of its project activities, FFGI has made provision for such services. A detailed account of activities involving language services is appended in Appendix III.

TABLE 1
TIME DISTRIBUTION
(Person-Days)

Name	Technical Assistance	In-Country Training	On-Campus Training	Increase and Maintain Technical Capabilities	Information Services	Networking Activities	Administrative Support	Total
STAFF								
Acasio				66.0				66.0
Baumann	-	29.0	59.0	-	-	-	717.0	805.0
Borsdorf	648.0	-	321.0	128.0	7.5	-	211.0	1,315.5
Burroughs	48.0	159.0	419.0	302.0	74.5	19.0	52.0	1,073.5
Chung	131.0	39.5	287.0	161.0	63.5	63.0	55.5	800.5
Dungey	12.0	-	10.0	-	1.0	2.5	204.0	229.5
Geiser	-	-	-	-	546.0	-	-	546.0
Foster	179.0	74.5	498.0	21.5	81.0	7.0	123.5	984.5
Haque	215.0	114.0	352.0	377.0	14.0	-	13.0	1,085.0
Heyne	15.0	-	-	-	-	-	-	15.0
Hugo	221.5	94.0	189.0	107.0	23.0	22.5	453.0	1,110.0
Kossou	-	70.0	-	-	-	-	-	70.0
Muth	-	-	-	93.0	-	-	-	93.0
Mills	41.5	44.5	57.5	14.0	23.0	0.5	2.5	183.5
Julian	42.0	40.0	17.5	2.0	13.0	15.0	213.5	343.0
Kiser	19.5	1.0	91.5	27.0	5.0	13.0	5.0	162.0
Longberg	-	-	-	1.0	198.5	-	-	199.5
Opheim	-	-	293.0	-	11.0	-	-	304.0
Pedersen	59.5	162.5	266.0	157.0	70.0	66.5	53.0	834.5
Peters	107.5	92.5	156.0	41.5	11.0	10.5	837.0	1,256.0
Phillips	82.0	-	386.5	392.5	26.5	34.0	41.5	963.0
Pierce	-	-	-	132.5	-	-	-	132.5
Reed	35.5	56.5	421.5	189.0	39.0	11.0	70.5	823.0
Reese	75.5	29.5	16.5	5.5	-	7.5	683.0	817.5
Schenck-Hamlin	-	-	3.0	-	701.5	-	-	704.5
Seib	-	16.0	-	-	-	-	-	16.0

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Name	Technical Assistance	In-Country Training	On-Campus Training	Increase and Maintain Technical Capabilities	Information Services	Networking Activities	Administrative Support	Total
Shuyler	-	-	9.0	24.0	-	-	-	33.0
Stevens, C.	30.0	-	-	-	-	-	-	30.0
Stevens, H.	62.0	-	-	-	-	-	-	62.0
Teague	-	30.0	-	-	-	-	-	30.0
Teter	645.0	-	-	-	-	-	-	645.0
Wright	105.0	117.0	285.5	411.0	45.5	4.0	31.0	999.0
Subtotal	2,774.5	1,169.5	4,138.5	2,652.5	1,954.5	276.0	3,766.0	16,731.5
CONSULTANTS								
Ackels	7.0	-	-	-	-	-	-	7.0
Briggs	19.0	-	-	-	-	-	-	19.0
Harris	-	-	-	-	-	5.0	-	5.0
Heid	28.0	-	-	-	-	-	-	28.0
Huyser	22.0	-	-	-	-	-	-	22.0
Ives	-	16.0	-	-	-	-	-	16.0
Pfost	41.0	-	-	-	-	-	-	41.0
Pine	15.0	-	-	-	-	-	-	15.0
Steele	19.0	-	-	-	-	-	-	19.0
Stryker	157.0	7.0	-	-	-	-	-	164.0
Teter	33.0	7.0	-	-	-	-	-	40.0
Thatcher	-	30.0	-	-	-	-	-	30.0
Subtotal	341.0	60.0	-	-	-	5.0	-	406.0
TOTAL	3,115.5	1,229.5	4,138.5	2,652.5	1,954.5	281.0	3,766.0	17,137.5

NOTE: Table does not include cost-sharing time.

SECTION II

TECHNICAL ASSISTANCE

Technical assistance consisted of one long-term assistance project in the Philippines and 60 short-term assignments in 41 different countries, involving 17 FFGI staff members and 10 consultants. The short-term technical assistance assignments are summarized in Table 2.

As its long-term technical assistance project, FFGI participated in the Southeast Asia Cooperative Post-Harvest Research and Development Programme through FY 1983. This program was sponsored by five international donor agencies and encompassed five ASEAN countries. The program was hosted by the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), University of the Philippines, Los Baños.

As a member of a multinational team of postharvest specialists, Mr. Norman Teter, FFGI long-term advisor, worked throughout the Southeast Asian area (Indonesia, Malaysia, Philippines, Singapore, and Thailand). The technical team's work was implemented in cooperation with the grain agencies and other national institutions of the participating countries. The team provided technical assistance to postharvest projects in four major areas: research, development, manpower training, and information.

Assistance was provided to research agencies in proposal planning and formulation, external donor support, management and monitoring of research activities, and analysis and evaluation of results. A total of 21 major research projects were carried out.

Development project assistance included technical advice and aid rendered by the technical team for operational activities such as design and development of equipment and facilities and formulation of feasibility studies. Seventeen development projects received continuous assistance throughout the duration of the project.

In the area of manpower training, the technical team conducted 14 regional and in-country training courses for various postharvest research and development workers. Furthermore, the technical team acted as resource persons for numerous country-organized training short courses in postharvest-related subjects.

Information services were organized and conducted to help facilitate the flow of relevant research and development information to postharvest workers in the project region. The activities undertaken included technical seminars on postharvest technology, exchange programs for personnel of grain handling and related agencies, numerous technical publications, establishment of the Postharvest Library, and attendance at international conferences and seminars.

TABLE 2
TECHNICAL ASSISTANCE

Travel Dates	Country	Personnel	Scope of Work
<u>1981</u>			
Jan. 9 - Jan. 30	Bangladesh	Haque	Assess process of wheat seed importation and recommend solutions for treating infested wheat seed.
Feb. 8 - Feb. 28	Rwanda	Kossou Mills	Assess storage practices of the Cooperative Crop Storage Program (OPROVIA) and of the National Grain Marketing Storage Program (GRENARWA).
Feb. 17 - Feb. 28	Costa Rica	Haque	Conduct a preliminary study of grain dryers for small farms. Determine specifications for a bulk grain storage facility in CARE's LEC plant.
Feb. 21 - Mar. 21	Zaire	Borsdorf Hugo	Prepare a rice marketing PID.
Mar. 27 - Apr. 13	Cameroon	Pedersen	Review grain storage practices and develop an outline for Phase II of the CREFFPHY crop protection training program.
May 16 - May 22	Burkina Faso	Julian	Conduct a training needs assesment and determine logistics for a "training of trainers" short course in grain storage management.
May 22 - May 31	Nepal	Julian	Conduct a training needs assessment for the Seed Production and Input Storage Project.
May 16 - May 30	Peru	Haque Kiser	Determine the need for grain drying, storage, and marketing to assist USAID/Lima in preparation of a project paper for the Upper Huallaga Area Development Project.

Travel Dates	Country	Personnel	Scope of Work
Aug. 22 - Aug. 30	Costa Rica	Chung Hugo Julian Kiser Pedersen	Develop a plan to conduct "An Analysis of the Postharvest Losses and Marketing Systems for Grains and Pulses" in cooperation with UCR/CIGRAS.
Aug. 30 - Sep. 30	Bolivia	Borsdorf Heyne Hugo Pine Stevens	Assess wheat collection center project financed with PL 480 funds.
Dec. 3 - Dec. 25	Rwanda	Sartori	Assist the Rwandan Government to determine the feasibility of long-term storage of dry beans.
Dec. 5 - Dec. 20 ∞	Haiti	Phillips	Assist in a food and agriculture development strategy study to develop and formulate options and make recommendations for future development strategy in Haiti.
<u>1982</u>			
Jan. 29 - Feb. 10	Botswana	Hugo	Conduct a training needs assessment in grain preservation and storage management.
May 22 - June 8	Tanzania	Wright	Conduct a Peace Corps in-service training needs assessment in grain storage.
Aug. 18 - Aug. 21	Kenya	Haque Wright	Visit with staff of the ICIPE to obtain information on plant materials for insect control to be used in the Tanzania short course.
Aug. 22 - Sep. 18	Senegal	Borsdorf Foster	Conduct a study on cereal grain reserves related to the Cereal Price Stabilization and Food Grain Reserve Component of the USAID Senegal ESF Project.
Sep. 24 - Oct. 7	Sierra Leone	Haque Mills	Review the managerial, technical, and scientific capabilities of the University of Sierra Leone to undertake a project proposal on grain storage at the farm level and to assist in the design of a more competitive project proposal.

Travel Dates	Country	Personnel	Scope of Work
Oct. 17 - Oct. 23	Ecuador	Ackels Hugo	Assess technical assistance needs for the wheat milling sector, especially wheat blends, training need requirements by ENAC, and long-term planning for delivery of required technical assistance and training needs.
Nov. 19 - Dec. 10	Thailand	Burroughs	Assist the SPHPB, Department of Agriculture, in exploring the present situation of aflatoxin contamination and ways to combat it.
Nov. 26 - Dec. 12	Pakistan	Borsdorf Mills	Assist USAID/Islamabad in the preparation of a Preliminary Project Design Development paper for the Postharvest Management Component of the Food Security Subproject under the Agricultural Production, Distribution, and Storage Project.
<u>1983</u>			
Jan. 5 - Jan. 7	Washington, D.C.	Phillips	Participate in workshop to evaluate criteria used in formulating agricultural marketing projects in LDCs as requested by USAID/Washington.
Jan. 14 - Feb. 28	Burma	Borsdorf	Assist USAID/Rangoon officials in conducting a pre-feasibility study for oilseed processing and edible oil distribution in Burma for future investment potentials.
Jan. 22 - Feb. 6	Costa Rica	Chung Phillips Reed	Review plans for proposed grain handling and storage facilities, and finalize the proposed short course on grain storage and management.
Jan. 26 - Mar. 3	Peru	Hugo Stryker	Conduct assessment of training needs, develop short course outlines, and determine grain storage capacity and grain storage capacity and grain drying equipment needs. Assess needs for additional short-term technical assistance in the Upper Huallaga Development Project Area.
Feb. 28 - Mar. 3	Ecuador	Hugo	Finalize plans for the upcoming short course to be held from March 14 through April 1, 1983, at KSU.

Travel Dates	Country	Personnel	Scope of Work
Apr. 15 - June 7	Pakistan	Borsdorf Foster Huyser Pedersen Pfof Stevens Wright	Provide technical assistance to USDA/OICD in Pakistan in the development of the Project Design of the Postharvest Management Component of the Food Security Subproject under the Agricultural Production, Distribution, and Storage Project.
Apr. 29 - May 10	Indonesia	Chung	Assist the government agency P.T. Pertani in evaluating its rice processing facilities and identifying its training needs and attend the Grains Postharvest Workshop and present a paper "Mass Transfer Coefficients for Natural Air Drying on Rough Rice."
May 22 - June 23	Ecuador	Stevens	Carry out an assessment of soft and hard red winter wheat mixes in the milling process and give recommendations. Establish training guidelines for Ministry of Agriculture.
July 5 - July 13	Costa Rica	Chung Phillips	Finalize short course for CNP personnel.
Sep. 6 - Sep. 9	Washington, D.C.	Borsdorf	Meet with State Department and OICD personnel in regard to upcoming travel to Burma.
Sep. 12 - Oct. 20	Burma	Borsdorf	Assist in preparation of Project Paper on the Oilseed Extraction Program.
Oct. 2 - Oct. 14,	Cape Verde	Pedersen	Prepare delayed IEE and assess equipment, training, and infrastructure needs for grain storage under PL 480 program.
Nov. 18 - Dec. 10	Philippines/ Indonesia/ Thailand	Teter	Gather information on the SEARCA program.
Nov. 27 - Dec. 17	Haiti	Borsdorf Foster	Conduct an Oilseeds Sector Assessment for Title III Development Project.

Travel Dates	Country	Personnel	Scope of Work
<u>1984</u>			
Jan. 13 - Feb. 19	Sri Lanka	Borsdorf	Review the status of project implementation and ascertain use of resource development through the project and recommend further GSL private sector development in grain marketing specifically in the area of postharvest practices.
Apr. 2 - Apr. 29	Uganda	Borsdorf	Prepare a PID on oilseed production.
Apr. 15 - May 15	Egypt/Tunisia/ Morocco/Jordan/ Syria	Hugo	Meet with USAID mission personnel.
Apr. 22 - Apr. 30	Costa Rica	Chung	Review plans and diagrams of proposed plants and design of proposed grain purchasing agencies for CNP.
May 27 - June 22	Peru	Heid Stryker	Develop an emergency grain storage plan and assist the GOP in developing recommended operational plans to address grain drying and storage needs as a result of large upcoming harvest.
June 14 - July 2	Philippines	Briggs Steele	Review a management and implementation study of the Food and Feed Processing Center at CLSU.
July 28 - Sep. 2	Sudan	Borsdorf Haque	Prepare technical and economic analyses of storage component for the Kordofan Rainfed Agriculture Project.
Aug. 26 - Aug. 30	Liberia	Burroughs Wright	Assess condition of stored PL 480 rice and develop new warehouse and storage procedures.
Sep. 2 - Sep. 29	Guatemala	Reed Stryker	Evaluate on-farm harvesting methods and storage systems for basic grains.
Sep. 29 - Oct. 18	El Salvador	Stryker	Evaluate and provide recommendations for on-farm grain storage and drying.
Nov. 9 - Nov. 23	Jordan	Haque	Study existing grain storage and handling system, advise engineers on proper methods and equipment, and suggest improvements for the storage and handling system.

Travel Dates	Country	Personnel	Scope of Work
Nov. 15 - Dec. 5	Senegal	Borsdorf	Conduct a study of CPSP operations and make recommendations for improving operations.
Dec. 6 - Dec. 14	Ghana	Borsdorf	Conduct an assessment of storage training needs.
<u>1985</u>			
Jan. 4 - Jan. 16	Zambia	Wright	Participate in a workshop on <u>Prostephanus truncatus</u> and plan a national strategy for pest control.
Jan. 19 - Feb. 21	Honduras	Hugo Phillips	Review, evaluate, and make recommendations for agricultural marketing of basic grains through cooperatives.
Feb. 3 - Feb. 16	Ecuador	Borsdorf Haque	Evaluate current grain storage situation, determine needed storage capacity, evaluate alternative approaches to grain storage, and set forth recommendations on storage needs.
Feb. 7 - Feb. 17	Senegal/Gambia	Wright	Examine on-farm storage practices and identify problems and strategies for research, training, and extension.
Feb. 25 - Mar. 8	Haiti	Borsdorf Haque	Review and evaluate proposed ADS II data collection process, discuss possible grain price stabilization activities, and assess the economic and physical utilization of bulk storage facilities.
Mar. 8 - Mar. 23	Indonesia	Phillips	Review the progress of postharvest studies by the South Sulawesi team, and assist with South Sulawesi team activities.
Mar. 9 - Mar. 17	Costa Rica	Chung	Review and evaluate Phase I of CIGRAS postharvest research program, and assist in preparing a proposal for Phase II.
Mar. 12 - May 5 and May 25 - June 23	Ecuador	Stryker	Evaluate existing technical problems in ENAC grain handling and storage facilities, recommend management strategies for drying and storing grain, and recommend technical improvements for ENAC facilities.

Travel Dates	Country	Personnel	Scope of Work
Mar. 23 - Mar. 30	Panama	Hugo	Evaluate the current training level and training requirements in the grain postharvest area for the technical personnel of IMA - Panama.
May 28 - June 7	Belize	Phillips	Assess necessary changes in the BMB in order to improve its operations.
June 10 - June 21	Costa Rica	Phillips	Review results of CIGRAS research and marketing and post-production handling of basic grains in Costa Rica.
<u>1986</u> Jan. 18 - Jan. 29	Chad	Foster Reed	Review current situation, prepare a training proposal, and make arrangements for training course.

SECTION III

IN-COUNTRY TRAINING

A total of 12 in-country training programs were presented by FFGI in 9 countries, with 288 participants receiving training in the areas of postharvest grain systems through these programs. A training manual was prepared for each training course presented by FFGI. In addition, FFGI participated in 17 workshops, seminars, and short courses conducted by other organizations in 11 countries. Over 400 participants were involved in these training functions. A summary of the in-country training is given in Table 3.

TABLE 3
IN-COUNTRY TRAINING

Course Dates	Country	Participants	Personnel	Scope of Work
<u>1980</u>				
Sep. 8 - Oct. 17	Senegal	15	Foster Kossou Pedersen Teague Thatcher	Conduct the Cours d'Entraînement sur la Conservation des Grains et la Gestion du Stockage (Training of Trainers Short Course on Grain Conservation and Storage Management).
<u>1981</u>				
Feb. 13 - Feb. 19	Rwanda	26	Kossou Mills	Conduct the Séminaire sur la Conservation des Grains (Seminar on Grain Preservation).
¹⁷ May 2 - May 18	Philippines	42	Geiser	Conduct a seminar on PHDS for researchers in the Philippines.
Aug. 15 - Aug. 23	Korea		Chung	Assist in conducting the Rice Post-Production Technology Workshop.
Oct. 9 - Oct. 18	Philippines		Seib	Present a paper at the Seminar on Paddy Deterioration in the Humid Tropics.
Nov. 5 - Nov. 24	Nepal	20	Hugo Pedersen	Assist in conducting the Grain and Seed Storage Management Short Course.
Nov. 13 - Dec. 4	Philippines	30	Wright	Lecture in the Training Course on Postharvest Prevention of Waste and Loss in Rice.
<u>1982</u>				
Jan. 12 - Jan. 30	Thailand		Chung	Present a paper at the 1982 Grains Postharvest Workshop.

Course Dates	Country	Participants	Personnel	Scope of Work
Mar. 28 - Apr. 18	Botswana	22	Hugo Pedersen Reed	Conduct the Grain Preservation and Warehouse Management Short Course.
May 10 - June 4	Burkina Faso	15	Foster Kossou Teague Wright	Conduct the Cours d'Entrainement sur la Conservation des Grains et la Gestion du Stockage (Trainers Course on Grain Preservation and Storage Management).
Aug. 22 - Sep. 2	Tanzania	16	Haque Wright	Conduct short course as in-service training for PCVs previously trained at KSU.
Oct. 13 - Oct. 16	El Salvador		Hugo	Participate and present a paper at the First National Storage Congress.
<u>1983</u> Feb. 18 - Feb. 28	England		Wright	Participate and present a paper at the GASGA Workshop on the Greater Grain Borer.
Feb. 28 - Mar. 15	Paraguay	14	Ives	Assist in conducting a short course in grain drying and preservation.
Mar. 19 - Mar. 24	Italy		Harris Reed	Participate in GASGA/FAO workshop on loss assessment in postharvest loss reduction programs.
Apr. 8 - Apr. 9	Australia		Wright	Participate in the Symposium on the Practical Aspects of Controlled Atmosphere and Fumigation in Grain Storage.
May 15 - May 16	Korea		Chung	Present a postharvest grain seminar and review a cooperative research project.
Nov. 14 - Dec. 10	Philippines	30	Teter	Lecture in the training course on Post-Harvest Prevention of Paddy/Rice Loss.

Course Dates	Country	Participants	Personnel	Scope of Work
<u>1984</u>				
Jan. 30 - Feb. 11	Costa Rica	27	Chung Hugo Pedersen	Assist in conducting the Curso Intensivo de Almacenamiento y Administración de Granos (Grain Storage and Management Short Course).
May 14 - May 25	Peru	27	Burroughs Haque	Conduct the Curso Intensivo de Manejo, Acondicionamiento, y Almacenamiento de Granos (Grain Handling, Conditioning and Storage Short Course).
Aug. 1 - Aug. 12	Nepal	32	Pedersen	Assist in conducting the Seed Quality Control and Storage Workshop.
Aug. 21 - Aug. 24	Malaysia	80	Chung	Present technical papers and participate in the 1984 Grains Post-Harvest Workshop.
Sep. 3 - Sep. 14	Botswana	18	Burroughs Wright	Present the Grain Storage Short Course.
Sep. 18 - Sep. 21	Guatemala	33	Reed Stryker	Present the Curso Intensivo de Almacenamiento y Procesamiento de Granos Básicos en las Fincas del Altiplano (Short Course on Grain Storage and Processing on the Farms of Altiplano).
<u>1985</u>				
Feb. 18 - Feb. 26	Liberia	19	Burroughs Wright	Present the Warehouse Storage Management Short Course.
July 8 - July 12	Costa Rica	32	Hugo	Participate and lecture in the Taller-Curso sobre Almacenamiento y Endurecimiento del Frijol (Workshop-Course on Storage and Hardening of Beans).
Aug. 12 - Aug. 16	Peru	31	Burroughs	Present the Curso Intensivo de Almacenamiento de Granos (Grain Storage Short Course).
Aug. 19 - Aug. 23	Peru	24	Haque Urrelo	
Oct. 6 - Oct. 13	Malaysia	120	Chung Teter	Present papers at the International Seminar on Preserving Grain Quality and In-Store Drying.

SECTION IV

ON-CAMPUS TRAINING

On-campus training activities are divided into three basic areas: (1) academic degree training in four disciplines, (2) the annual Grain Storage and Marketing Short Course (GSMSC), and (3) special short courses and programs which are presented upon request.

Academic Training

The four disciplines encompassed by FFGI academic training are agricultural economics, agricultural engineering, entomology, and grain science. Faculty members of FFGI advised and assisted 61 graduate students sponsored by national and international institutions who are working on degrees in fields concerned with postharvest storage, handling, and marketing practices. A list of persons trained is given in Table 4.

Grain Storage and Marketing Short Course

The GSMSC is an annual course which has been presented at KSU since 1970. A brochure describing the GSMSC was sent to USAID missions, other institutions in developing countries, and individuals requesting information on the course.

The 7-week short course was presented annually during June and July to 145 participants from 48 countries. The names and countries of the participants are shown in Table 5.

The goal of this course was to improve the efficiency and effectiveness of developing-country grain storage and marketing organizations. Participants received instruction in all basic areas of grain storage and marketing. In addition, each participant elected to specialize in marketing or storage. Besides lectures, discussions, and laboratory experiences, participants learned through field trips and an 8-day study tour which included stops at port facilities, rice mills, and the board of trade.

Lectures and laboratory sessions were delivered in English with simultaneous interpretation into Spanish and French. Interpretation was also provided on all field trips. Manuals and written materials were supplied in English, Spanish, and French.

Special Short Courses and Programs

FFGI presented 10 special short courses to a total of 81 participants from 20 countries. These courses ranged in duration from 1 day to 20 weeks, depending on the request and the training needs identified. Details on these special courses are given in Table 6.

TABLE 4
ACADEMIC TRAINING

Country	Name	Subject Area
Egypt	A. Hashem	Agricultural economics
Honduras	A. Nashem	
	L. Dávila	
	O. Martínez	
	A. Reyes	
	J. Reyes	
Korea	J. Thiebaud	
	H. Lee	
	B. Ryu	
Nigeria	Y. Song	
	C. Agbo	
Philippines	T. Monyatsi	
	H. Costodio	
	V. Eusebio	
	R. Manalo	
	H. Montalvo	
	E. Olan	
	E. Santiago	
	E. Sto. Domingo	
Saudi Arabia	Z. Toquero	
Venezuela	A. Al-Obaid	
	C. Hugo	Agricultural engineering
Costa Rica	R. Jiménez	
Ecuador	L. Gonzaga	
Indonesia	B. Kanujoso	
Korea	D. Chang	
	C. Choi	
	Y. Kim	
	Y. Lee	
	K. Park	
Philippines	J. Cruz	
Sudan	A. Guevarra	
	S. Abbouda	
	G. Abdelmoshin	
USA	D. Cederstrom	
	S. Johnson	
Venezuela	J. Garcia	
Yemen	Y. Assalimy	
Malaysia	N. Osman	
Peru	R. Urrelo	
Sudan	A. Itto	
	Y. Seifelnasr	
	V. Wang	
Taiwan	R. Sweet	
USA		

Country	Name	Subject Area
Benin	D. Kossou	Grain science
Brazil	M. Sartori	
Costa Rica	M. Zeledón	
Ghana	R. Bediako	
Honduras	J. Espinal	
Indonesia	M. Sidik	
Saudi Arabia	H. Almana	
Senegal	M. N'Dir	
Sudan	S. Abbouda	
	Y. Siefelnasr	
	L. Wongo	
Thailand	M. Naewbanij	
	A. Ungsunantwiwat	
Uganda	R. Kasadha	
USA	S. Graham	
	C. Reed	
Venezuela	A. Arrevillagas	

TABLE 5
GRAIN STORAGE AND MARKETING SHORT COURSE

<u>Year</u>	Country	Name
<u>1981</u>	Bangladesh	S. Alom
	Cameroon	I. Lazare
	Costa Rica	M. Zeledón
	El Salvador	V. Martínez
		J. Orellana
	Ghana	J. Baah
	Honduras	S. Chavez
		G. Puerto
		A. Reyes
		M. Sanchez
	Jordan	A. Odeh
	Malaysia	N. Osman
	Mexico	C. González
		J. González
		J. Sánchez
		R. Teran
	Nigeria	A. Adeyinka
		A. Kehinde
	Rwanda	E. Munyandamutsa
	Senegal	D. Abdoulaye
		S. Banda
		S. Bounama
		T. N'Dao
Sierra Leone	E. Williams	
Tanzania	K. Mbwilo	
<u>1982</u>	Botswana	T. Khiwa
	Burma	N. Swe
		T. Tun
		C. Tin
		M. Win
	Guinea	L. Bangaly
	Jordan	M. Abulghanam
		N. Al-Saie
	Kenya	A. Mwangolo
	India	V. Sehgal
	Liberia	D. Kenkpen
	Malaysia	I. Hassan
		M. Yusoff
	Morocco	J. Brahim
		B. Hassane
	Nigeria	H. Abubakar
	Paraguay	R. Acuna
		V. Marecos
	M. Palacios	

<u>Year</u>	<u>Country</u>	<u>Name</u>
	Philippines	J. Jamias
	Rwanda	P. Kayinamura
	Sri Lanka	R. Veeraraghaven
	Togo	K. Ayaovi
		K. Bangana
<u>1983</u>	Burundi	M. Havyarimana
	Ecuador	C. Armas
		R. Gallardo
		R. Guevara
		F. Espinoza
	Ethiopia	M. Dagne
	Honduras	J. Rodríguez
		A. Ordóñez
		M. Maradiaga
		R. Osorto
	Kenya	A. Asress
	Peru	C. Benza
		R. Guerra
		J. Morales
		L. Pinella
		G. Vela
		E. Vilcapoma
	Saudi Arabia	F. Al-Yaeesh
	Sudan	L. Wongo
	Tanzania	A. Ngondo
	Venezuela	A. Arrevillagas
	Yemen	D. Abdu Nasher
	Zambia	M. Maliande
		M. Mweemba
<u>1984</u>	Botswana	M. Modise
	Burundi	P. Banyankiye
		V. Ndayishimiye
	Costa Rica	R. Vilavicencio
	Ecuador	H. Cadena
		G. Céspedes
		J. Gómez
		L. Gonzaga
		M. Soria
	Guatemala	J. Calderón
		J. Montenegro
		C. Portillo
		M. Rivera
		M. Rodríguez

Year	Country	Name
	Honduras	L. Guillén C. Mackay O. Martínez F. Pérez L. Pinel M. Rodríguez J. San Martín
	Korea	J. Thiebaud E. Chang D. Chung B. Lee K. Park K. Park
	Lesotho	N. Moletsane
	Mali	M. Kone
	Morocco	M. El Bouziri W. Hamami M. Sirissy
	Sudan	A. Ohaj
	Turkey	N. Erdag
	Zaire	W. Muyumba
	Zambia	E. Ngandu J. Milimo
<u>1985</u>	Congo	A. Massala B. Moussongo S. N'Koukou
	Costa Rica	R. Jiménez G. Rivas O. Serraulte
	Cyprus	I. Potsos
	Gambia	F. Dumbuya
	Guatemala	F. Higueros K. León J. Munguia O. Orellana H. Salazar
	Honduras	R. Campos C. Cerros P. Duarte O. Laínez M. Pineda
	Indonesia	B. Adinugroho
	Kenya	A. Ibrahim R. Kituyi K. Mogoi
	Malawi	C. Kisyombe
	Mexico	R. Castillo J. Etchegaray J. Leos V. Palma

<u>Year</u>	<u>Country</u>	<u>Name</u>
	Pakistan	I. Unar
	Rwanda	A. Harelimana
	Sri Lanka	S. Navaratne
	Sudan	M. Yousif
	Uganda	J. Rwampwany
	Zaire	K. Nginga
	Zambia	E. Sakufiwa
	Zimbabwe	M. Reeves

TABLE 6
SPECIAL SHORT COURSES AND PROGRAMS

Subject	Duration	Country	Name
<u>1980</u>			
Computerized methods for feasibility analysis	4 weeks	Korea	M. Lee S. Kim
<u>1981</u>			
Systematic procedures for effective project formulation and evaluation	12 weeks	India	U. Meta R. Nagaraj R. Sharma
Peace Corps training for Tanzania	5 weeks	USA	J. Baker M. Bowman D. Braun K. Choi C. Curti J. Douglas K. Flynn C. Franzen T. Gerhardt D. Higer M. Higgins L. Newby D. Peters J. Piccoli R. Poole L. Regan T. Rice M. Robards
Training in loss assessment	20 weeks	Ghana	J. Baah
Grain storage engineering	6 weeks	India	V. Sehgal
<u>1982</u>			
Grain handling and storage	1 week	Nigeria	A. Azih M. Ogbouji
<u>1983</u>			
Grain handling, conditioning, and storage	3 weeks	Ecuador	F. Aguirre F. Alava J. Baldassari E. Fernández B. Narváez W. Quevedo

<u>Subject</u>	<u>Duration</u>	<u>Country</u>	<u>Name</u>
Grain storage, handling, marketing, and engineering	2 weeks	Pakistan	M. Abbas N. Ahsan A. Khan B. Khan M. Khan M. Memon M. Mengal C. Muhammad G. Nausherwani M. Safdar M. Taj
<u>1984</u>			
<u>Prostephanus truncatus</u>	2 days	Costa Rica Guatemala Honduras Mexico Sudan USA Zaire Zambia	M. Zeledón A. Chiri R. Espinal F. Pérez L. Guillén L. Pinel J. San Martín J. Mihm M. Ramírez J. Leos A. Ohaj L. Wongo Y. Seifelnasr R. Mills J. Nechols W. Ramoska E. Horber F. Poston R. Higgins P. Gansberger W. Muyumba E. Ngandu E. Sakufiwa J. Milimo
<u>1985</u>			
<u>Prostephanus truncatus</u>	1 day	Congo Guatemala Kenya Malawi Mexico Sri Lanka Uganda Zimbabwe	A. Massala B. Moussongo S. N'Koukou F. Higueros J. Munguia H. Salazar R. Kituyi K. Mogoi C. Kisyombe J. Leos S. Navaratne J. Rwampwany M. Reeves

SECTION V

INCREASE AND MAINTAIN TECHNICAL CAPABILITIES

The increasing and maintaining of technical capabilities by FFGI staff members involves two broad avenues of pursuit. The first of these is research activities directed towards gaining new knowledge. The second is attendance at professional and technical meetings for the purpose of broadening the knowledge base of the FFGI staff.

Research Activities

These activities involve research projects by which FFGI staff members can formulate solutions to be applied to a wide range of problems existing in developing countries, assist developing-country institutions in improving human resources and research technologies, and provide applied training for developing-country researchers. In addition, academic students receiving training at KSU can work towards obtaining information which will be directly applicable to the situations in their home countries, thus providing a transfer of information and technology of immediate benefit for solving specific problems.

FFGI research activities are summarized in Table 7.

Professional and Technical Meetings

FFGI staff members attended various professional and technical meetings to keep abreast of new developments in their respective fields. Attendance at these meetings is indicated in Table 8.

TABLE 7

RESEARCH ACTIVITIES

Grain Storage and Handling

- Airflow characteristics under aeration and drying conditions
- Alternative methods of stored-product insect control using insect growth regulators: evaluation of grain quality
- Bibliography of plant materials for stored-product insect control
- Bibliography on postharvest losses of grains
- Bibliography on Prostephanus truncatus, the larger grain borer
- Biology and behavior of Corcyra cephalonica, the rice moth
- Changes in quality of rough rice during aerated storage
- Comparison of in-head and threshed storage of sorghum
- Comparison of methods for determining internal infesting insects in pearl millet
- Comparison of three methods of maize storage in Honduras
- Corn damage by drag conveyors
- Crushed pearl millet cobs as a barrier to Sitophilus oryzae infestation in threshed pearl millet storage: a preliminary study
- Damage to pearl millet under simulated traditional storage conditions by Sitophilus oryzae
- Damage to pearl millet under simulated traditional storage methods by Sitotroga cerealella
- Deterioration of rough rice as measured by carbon dioxide production
- Development of a natural convection dryer for use in developing countries
- Early detection of insects in bulk stored grain
- Effect of airtight/underground storage on grain quality and insect populations in pearl millet
- Effect of drying on rice milling yield
- Effect of edible oil treatments on moisture content and fungal invasion of stored wheat
- Effect of fines and brokens on grain quality changes in stored grain sorghum
- Effect of insects' interaction on stored milled rice and its basic model of structure
- Effect of temperature changes on rice weevil
- Effect of threshing methods on infestibility of pearl millet by some stored-product insects
- Effect of tricalcium phosphate on insect control and soft wheat flour quality
- Effectiveness of adding threshing debris over threshed pearl millet as a barrier against stored-grain insects in simulated traditional storage units
- Effects of insect interaction on milled rice and a sample model to evaluate insect population growth
- Estimating stored-grain insect populations: invasion of grain from local reservoirs
- Estimating stored-product insect populations: comparison of grain probe and trap probe sampling
- Estimating stored-product insect populations: trap studies in small bins
- Evaluation of grain cleaners
- Evaluation of hygroscopic and thermal properties of cereal grains and oilseeds
- Evaluation of methoprene as a grain protectant

Evaluation of traditional vs. chemical methods for preserving maize on farms in Honduras
 Extent of damage to stored milled rice by insect infestation
 Factors affecting storage of sorghum
 Factors affecting the storage of pearl millet
 Feed processing plant design and analysis for developing countries
 Feeding damaged grain to ruminants
 Grain aeration under humid air conditions
 Grain drying by zeolite
 Heat and mass transfer in stored grain sorghum
 Heat transfer by natural convection in stored grains
 Hygroscopic properties of rewetted corn
In vitro digestibility of fungal or insect-damaged sorghum
 Infestibility of pearl millet by stored-product insects
 Investigation of the accuracy of two postharvest grain loss assessment methods
 Laboratory flight studies of grain weevils (Curculionidae, Sitophilus)
 Loss assessment techniques on various types of cereal grains
 Modeling and optimization of feed mill
 Modeling for dryer selection and simulation of natural air drying of rough rice
 Moisture migration within stored grain sorghums
 Moisture sorption and quality losses in bagged grains stored under tropical conditions
 Natural convection grain dryer design for Upper Huallaga region of Peru
 Natural convection heat transfer in stored milo
 Olfactory response of red flour beetles, Tribolium castaneum (Herbst), to various forms of wheat, millet and a fungus as determined by a light-sensitive apparatus
 Optimum systems of rough rice handling, drying, and storage
 Penetration and reproduction potential of selected stored-product insects in columns of pearl millet
 Postharvest deterioration of rough rice, milled rice, and brown rice
 Post-production loss assessment methodology
 Quality of dry beans in storage
 Quality of pinto beans stored under nitrogen versus air
 Quality of maintenance of rough rice in storage
 Resistance of pearl millet cultivars to stored-product insects
 Resistance to airflow through grain sorghum
 Resistance to airflow through rough rice
 Resistance to airflow through wheat
 Resistance to three geographic populations of the maize weevil, Sitophilus zeamais Motschulsky (Coleoptera, Curculionidae), in native cultivars of corn from the Yucatan Peninsula
 Rice deterioration rate under various environmental conditions
 Static pressure drop in a fixed bed of grain as affected by grain moisture content and fines
 Straw-fired furnace for grain drying purposes
 Strength and water durability of stabilized clay containing lime, rice-hull ash, sodium chloride, and/or straw, potential construction material for on-farm storage in developing countries
 Study of dispersal and population development of Sitophilus oryzae in 50-bushel bins of pearl millet
 System for assessment of post-production losses of rice under alternative marketing systems
 Tricalcium phosphate as an insect inhibitor

Underground grain storage methods for developing countries
Underground storage of pearl millet
Underground storage: quality of corn after 10 months in cement-lined pit
Use of aspiration as a means of grain cleaning and/or sampling
Utilization of grain dusts for alcohol production

Grain Marketing

Alternative food grain stability program for central Asian countries
Analysis of food security programs in LDCs
Computerized system for feasible agribusiness development
Critical evaluation of alternative rice post-production technologies in Central Luzon and Bicol Regions, Philippines
Economic analysis
Feasibility of food security reserves for Korea
Food reserves in Honduras
Impacts of general economic and trade policies of LDCs
Improvement of grain marketing systems in LDCs
Livestock and poultry schemes in Nigeria
Long-term trend in food supply balances in selected developing areas of the world
Measurement of benefits from Philippine grain stabilization programs
Projected food supply and trade balances for China
Quantitative analysis to support LDC grain policies
Simulated food grain security reserve program for corn and rice in Central America and Panama from 1960 to 1980
Simulating the impact of alternative food reserve programs: the ASEAN case
Simulation of a food security system for the countries of South Asia
Simulation of a food security system for the countries of Northeast Asia, Southeast Asia and Oceania

TABLE 8

PROFESSIONAL AND TECHNICAL MEETINGS

Travel Dates	Personnel	Location	Type of Meeting
<u>1980</u>			
Nov. 8 - Nov. 17	Geiser	San Francisco, California	Online '80 Conference
Dec. 2 - Dec. 5	Acasio Haque	Chicago, Illinois	American Society of Agricultural Engineers annual winter meeting
<u>1981</u>			
Mar. 16 - Mar. 20	Wright	Columbus, Ohio	Entomological Society of America North Central Branch Conference
Mar. 20 - Mar. 21	Haque	St. Joseph, Missouri	American Society of Agricultural Engineers
May 2 - May 6	Borsdorf	New Orleans, Louisiana	National Agri-Marketing Association annual conference
May 2 - May 7	Pedersen	St. Louis, Missouri	Association of Operative Millers 85th Annual Technical Conference
July 24 - July 30	Phillips	Clemson, South Carolina	American Association of Agricultural Economists annual meeting
Sep. 28 - Oct. 2	Pedersen	Brainerd, Minnesota	Association of Operative Millers Food Protection Committee meetings and technical conference
Oct. 31 - Nov. 6	Geiser	Dallas, Texas	Online '81 Conference
Nov. 30 - Dec. 4	Wright	San Diego, California	Entomological Society of America roundtable discussions and workshops
Dec. 15 - Dec. 18	Chung	Chicago, Illinois	American Society of Agricultural Engineers annual winter meeting

Travel Dates	Personnel	Location	Type of Meeting
<u>1982</u>			
Feb. 2 - Feb. 5	Pedersen	New Orleans, Louisiana	Association of Operative Millers Food Protection Committee meetings and technical conference
Mar. 22 - Mar. 25	Wright	Sioux Falls, South Dakota	Canadian Roundtable Discussions and workshop
May 15 - May 21	Pedersen	Atlanta, Georgia	Association of Operative Millers Food Protection Committee meetings and technical conference
Sep. 13 - Sep. 17	Pedersen	Brainerd, Minnesota	Association of Operative Millers Food Protection Committee and Safety Committee meetings
Dec. 12 - Dec. 17	Chung	Chicago, Illinois	Short Course on Energy Conservation in Food Processing, American Society of Agricultural Engineers annual winter meeting
38			
<u>1983</u>			
Jan. 25 - Jan. 29	Pedersen	Houston, Texas	Association of Operative Millers Food Protection Committee meeting
Apr. 10 - Apr. 18	Wright	Perth, Australia	International Symposium on the Practical Aspects of Controlled Atmosphere and Fumigation in Grain Storage
May 7 - May 10	Pedersen	Kansas City, Missouri	Association of Operative Millers Food Protection Committee meetings and technical conference
Oct. 23 - Oct. 27	Burroughs Pedersen Reed Wright	Manhattan, Kansas	Third International Working Conference on Stored-Product Entomology
Nov. 8 - Nov. 10	Pedersen	Minneapolis, Minnesota	Meeting on guidelines for minimum requirements for packaging/repackaging of pesticides and facilities requirements for overseas shipment
Dec. 13 - Dec. 16	Haque	Chicago, Illinois	American Society of Agricultural Engineers annual winter meeting

Travel Dates	Personnel	Location	Type of Meeting
<u>1984</u>			
May 10 - May 16	Pedersen	Minneapolis, Minnesota	Association of Operative Millers Food Protection Committee meetings and technical conference
Sep. 4 - Sep. 7	Pedersen	Minneapolis, Minnesota	Association of Operative Millers Food Protection Committee meeting
Oct. 29 - Nov. 2	Hugo	Vigosa, Brazil	Second Latin American Seminar on Postharvest Grain Losses
Nov. 12 - Nov. 13	Pedersen	Washington, D.C.	Postharvest Grain Loss meeting with USDA
Nov. 21 - Nov. 28	Phillips	Washington, D.C.	Postharvest Marketing System Workshop (Indonesia)
<u>1985</u>			
Jan. 8 - Jan. 11	Pedersen	Tampa, Florida	Association of Operative Millers Food Protection Committee meeting and technical conference
May 27 - May 30	Wright	Manila, Philippines	Seminar on Pesticides and Humid Tropical Grain Storage Systems
Sep. 3 - Sep. 6	Pedersen	Brainerd, Minnesota	Association of Operative Millers Food Protection Committee meeting
Dec. 17 - Dec. 20	Chung Haque	Chicago, Illinois	American Society of Agricultural Engineers annual winter meeting

SECTION VI

INFORMATION SERVICES

In order to be useful, research and technical assistance findings must be distributed to interested organizations and individuals in developing countries. This can be done in part by training, but only limited numbers of persons are reached in this way. To aid in the dissemination of information on postharvest grain systems, FFGI provides access to its Postharvest Documentation Service (PHDS), prepares publications on activities carried out, and responds to requests for these publications.

Postharvest Documentation Service

Since its inception in June 1979, PHDS has been providing information to developing countries on postharvest cereal grain and legume systems. The major functions of PHDS are as follows:

1. Centralize a definitive working collection of publications on postharvest issues
2. Maintain a computer-searchable data file of bibliographic information from the collected documents
3. Produce and disseminate serial publications announcing current acquisitions
4. Reproduce and disseminate copies of PHDS documents to clients
5. Respond to specific information requests by means of manual or computer searches or referrals

Acquisitions to the PHDS collection, as reflected by documents listed in the bimonthly acquisitions lists, now total 8,125 documents. Documents are acquired in four major subject areas: biology, economics, engineering, and nutrition. Specific topics in biology include grain properties, insects, microorganisms, rodents, and birds. Specific topics in economics include analytical models, facilitating functions, marketing facilities, marketing operations, public policies, supply and demand, and trade. Specific engineering topics include conditioning, drying, physical grain properties, handling, harvesting, processing, and storage facilities. Nutritional topics include animal nutrition, human nutrition, and utilization of by-products.

	<u>FY 1981</u>	<u>FY 1982</u>	<u>FY 1983</u>	<u>FY 1984</u>	<u>FY 1985</u>	<u>FY 1986</u>
Annual acquisitions	815	605	671	1,698	1,741	670
Cumulative total	2,740	3,345	4,016	5,714	7,455	8,125

PHDS clients are primarily researchers in government or private institutions. Institution libraries make up the second largest group of clients. Other clients are extension workers and administrators. The increase in the number of clients is shown below.

	<u>FY 1981</u>	<u>FY 1982</u>	<u>FY 1983</u>	<u>FY 1984</u>	<u>FY 1985</u>	<u>FY 1986</u>
Annual increase	152	61	25	153	37	126
Cumulative total	183	244	269	422	459	585

PHDS clients requested 20,637 documents, bringing the total number of document requests to 21,414, as shown below.

	<u>FY 1981</u>	<u>FY 1982</u>	<u>FY 1983</u>	<u>FY 1984</u>	<u>FY 1985</u>	<u>FY 1986</u>
Annual requests	1,315	4,620	3,723	4,125	3,933	2,921
Cumulative total	2,092	6,712	10,435	14,560	18,493	21,414

Publications

Results of FFGI activities are published in the form of technical assistance reports, research reports, and special reports. Other publications, including journal articles are written as circumstances require.

FFGI staff members and consultants have published 25 technical assistance reports, 7 research reports, 2 special reports, and 9 other publications. A detailed list of publications is presented in Table 9.

Requests for Publications and Technical Information

FFGI publications are available for distribution upon request. A total of 1,190 technical assistance reports, 450 research reports, and 374 special reports were distributed. In addition, 108 requests for technical information were received from 41 different countries. These information requests are detailed in Table 10.

Visitors

A total of 142 visitors from 40 countries visited FFGI during the time period covered by this report. The names, countries, and purpose of the visits are given in Table 11.

TABLE 9
PUBLICATIONS

Author	Title
<u>FFGI Technical Assistance Reports</u>	
Ekramul Haque, Harvey Kiser	(An) Analysis of Grain Drying, Storage and Marketing in the Upper Huallaga Area Development Project and the Subtropical Lands Development Area in Peru
Henry Stevens	Analysis of the Utility of Substitution of Soft Red Winter Wheat for a Portion of the Imported Wheat Currently Being Milled in Ecuador
John Pedersen	Assessment of Equipment, Training, and Infrastructure Needs for Grain Storage in Cape Verde and an Initial Environmental Examination
Roe Borsdorf, Kathy Foster	(A) Compilation of Market Price Data for Cereals and Beans, Haiti
Roe Borsdorf, Kathy Foster	(The) Edible Oil and Fat Sector in Haiti
Roe Borsdorf, Ekramul Haque	ENAC Capacities for Storing and Conditioning 1985 Rice and Corn Harvest
Roe Borsdorf	Evaluation of Rice Import Operations of the Caisse de Péréquation et de Stabilisation des Prix, Senegal
Do Sup Chung, Richard Phillips, Carl Reed	Evaluations of Training Needs and Grain Handling Facilities of CNP, and CIGRAS Research Project in Costa Rica
Roe Borsdorf, Kathy Foster, Ekramul Haque	Feasibility of a Grain Price Stabilization Program in Haiti
Cornelius Hugo, Harold Stryker	Grain Handling, Conditioning and Storage in the Upper Huallaga Area
Ekramul Haque	Grain Storage and Handling in Jordan: Ministry of Supply Silos at Aqaba, Juweideh, and Irbid

Author	Title
Roger Bullard, Harold Stryker	Improved Grain Storage and Pest Control in El Salvador, Evaluation and Recommendations (Spanish also)
Cornelius Hugo, Richard Maxon, Richard Phillips	Marketing Basic Grains through Cooperatives in Honduras
Donald Anderson, Roe Borsdorf	(The) Paddy Storage and Processing Project and Future Postharvest Development in Sri Lanka
Walter Heid, Harold Stryker	Peru's Grain Marketing Infrastructure: Changes Needed to Reduce Post-Harvest Losses
Roe Borsdorf, Kathy Foster, Wipada Huyser, John Pedersen, Harry Pfof, Henry Stevens, Valerie Wright	Postharvest Management Project Design, Pakistan
Carl Reed, Harold Stryker	Post-Production Systems for Basic Grains in the Western Highlands of Guatemala: A Description and Evaluation
Roe Borsdorf, Robert Mills	Preliminary Project Design Development--Postharvest Management Component of Food Security Subproject Agricultural Production, Distribution, and Storage Project 391-0476--A Working Paper
Roe Borsdorf, Ekramul Haque	Project Design, Storage and Inventory Loan Component, Kordofan Rainfed Agriculture Project, Sudan
Alden Ackels, Cornelius Hugo	Project Identification Mission: Analysis of Current and Future Needs of the Wheat Milling and Baking Industries in Ecuador (Spanish also)
Cornelius Hugo	Project Identification Mission: Assessment of Current and Future Technical Assistance and Training Needs of ENAC, Ecuador (Spanish also)
Ekramul Haque, Robert Mills	Project Proposal--Design Construction and Field Testing of Rice Drying and Storage Facilities Appropriate for Sierra Leone Farmers

Author	Title
Harold Stryker	Review and Recommendations for ENAC Grain Plants, Ecuador (Spanish also)
Roe Borsdorf, Kathy Foster	(A) Survey of Cereal Reserve Requirements in Senegal
Roe Borsdorf, Elmer Heyne, Cornelius Hugo, Wilfred Pine, Henry Stevens	Wheat Production and Associated Marketing Problems in Bolivia
<u>FFGI Research Reports</u>	
Christopher Agbo, Richard Phillips	Alternative Grain Stabilization Programs for Nigerian Food Security
Roe Borsdorf, Cornelius Hugo Richard Phillips	Application of Transportation Linear Programming for Optimum Number and Location of Public Rice Warehouses in Sri Lanka
John Pedersen, Richard Phillips, Zenaida Toquero	Evaluation of Alternative Post-Production Technologies in Central Luzon and Bicol Regions, Philippines
Zenaida Toquero	Institutional Factors Affecting Rice Postharvest Practices in the Philippines
Do Sup Chung, Charles Deyoe, Sang Ha No	Potential Uses of Grain Sorghum for Formula Feeds in Korea
Do Sup Chung, Charles Deyoe, Apolonio Guevarra	(A) Straw-Fired Furnace for Grain Drying Purposes
Do Sup Chung, Robert McElhiney, Kyung Kyu Park	User's Guide of Computer Program for Feed Mill Design
<u>FFGI Special Reports</u>	
Chang Joo Chung	Rice Milling Technology
Roe Borsdorf	User's Guide to Exponential Smoothing as a Forecasting Tool

Author	Title
<u>Other Publications</u>	
Armando Reyes-Pacheco	Basic Outline for Methodological and Planning Process for Development of Food Security Programs, IICA
Emanuel Santiago	(A) Comparative Analysis of the Impact of Alternative Programs on the Food Security of ASEAN
Keith Behnke, Do Sup Chung, Kyung Kyu Park	Comparison of Mash and Pelleting Costs
Cornelius Hugo, Miguel Mora	Current Situation, Training Needs, and a Training Program in Grains Postharvest for Personnel of IMA - Panama
Norman Teter	Design Parameters for Storage and Handling Systems for Grain
9 th	
Do Sup Chung, Maitri Naewbanij, Paul Seib, Larry Seitz	Determination of Ergosterol Using Thin-Layer Chromatography and Ultraviolet Spectroscopy
Robert Mills, Noorma Osman, Valerie Wright	(The) Effect of Rearing Temperature on Certain Aspects of the Biology of <u>Corcyra cephalonica</u> (Stainton)
Do Sup Chung, Maitri Naewbanij, Paul Seib, Paul Seitz	Ergosterol: Index in Monitoring Fungal Damage in Rice
Robert Mills, Valerie Wright	Estimation of Stored-Product Insect Populations in Small Bins Using 2 Sampling Techniques
Paul Kelley, Richard Phillips, Byung Seo Ryu	Feasibility of Food Security Reserves for Korea
Robert Mills, Fred Watters, Noel White, Valerie Wright	Future Directions and Current Problems for Stored-Product Entomology
Do Sup Chung, Larry Erickson, Boma Kanujoso, Chong-Ho Lee	Grain Aeration and In-Store Drying in USA

Author	Title
Do Sup Chung	Grain Postharvest Technology for Developing Countries
Do Sup Chung, J. Garcia, Paul Seib	Hygroscopic Properties of Rewetted Corn
John Pedersen	Insects and Other Pests that Affect Seed Quality
Dong Il Chang, Do Sup Chung	Mass Transfer Coefficient for Natural Air Drying of Rough Rice
Armando Reyes-Pacheco	Methodological Scheme for Diagnosis of Food Security, IICA
Armando Reyes-Pacheco	Methodological Scheme for Pre-Diagnosis of Food Security, IICA
Rosemary Burroughs, Valerie Wright	Mold-Damaged Grain Sorghum as a Diet for Three Stored-Grain Beetles (Coleoptera)
U Htay Aung, Roe Borsdorf, J. Givens, U Than Htay, Tung Aung Prue, Loren Schulze, U Mein Thain	Oilseed Processing and Edible Oil Distribution in Burma, Recommendations for Future Investment Potentials
Do Sup Chung, Chong-Ho Lee	Physical and Thermal Properties of Grains
Rosemary Burroughs, James Glueck Harold Mohr, Larry Seitz	Preharvest Fungal Invasion of Sorghum Grain
Robert Mills, Valerie Wright, John Pedersen	Proceedings of the Third International Working Conference on Stored-Product Entomology
Rosemary Burroughs	Recommendations and suggestions to assist with aflatoxin survey and detection
Gahir Abdelmoshin, Do Sup Chung, Man Soo Kim	Resistance to Grain Sorghum to Airflow
C. S. Chang, Do Sup Chung, Harry Converse, R. Johnson	Shelled Corn Damage Using Drag-Type Conveyor

Author	Title
Valerie Wright	(The) Uses of Pesticides for Insect Control in Farm Storage
Valerie Wright	World Distribution of <u>Prostephanus truncatus</u> (Horn)

TABLE 10

TECHNICAL INFORMATION REQUESTS

FFGI Activities

FFGI activities	Bolivia, Haiti, Pakistan, Panama, Turkey, Zaire
Training programs	Burkina Faso, El Salvador, India, Nigeria, Rwanda, Sierra Leone
Postharvest training programs	Costa Rica
Technical assistance	Costa Rica
Grain storage training	Cyprus, USA
Postharvest technology programs	India, Somalia
Research in grain storage and handling	Mexico
PHDS	Morocco
Visual and audiovisual materials for training in postharvest technology	Nepal
Information to set up postharvest pathology course	USA
Long-term training	USA
Self-training manuals for grain storage tech- nicians at cooperatives in Kenya	USA

Food Grain Systems

Examples of loss assessment questionnaires and questionnaire development	Cameroon
Kenya small farm project	Canada
Grain marketing	Costa Rica
Postharvest food grain systems	Haiti
Postharvest grain losses	New Guinea, USA
Grain harvesting equipment for small farm uses in developing countries	Pakistan
Postharvest food losses in the Caribbean and Latin America	Switzerland
Appropriate technology in developing countries	USA
Grain properties	USA
Grain systems	USA
Rice production in developing countries	USA
Slides depicting postharvest losses	USA

Grain Drying, Handling, and Processing

Grain drying, storage, handling, and transportation	Argentina
Planning grain handling for storage, processing, and drying	Argentina
Design plan of natural convection dryer for on-farm use	Australia
Dryers for on-farm storage in developing countries	Australia
Small grain dryer (A'Brook)	Australia
Seed drying and storage	Bolivia

Technical information on psychrometric chart	El Salvador
Straw as an alternative fuel for grain drying	Germany
Grain handling equipment	India
Modified convectional dryer for developing countries	Italy
Hygroscopic properties of grain and oilseeds, and natural air drying of grains	Korea, USA
Corn milling and milled corn products	New Guinea
Alkali treatment of straw for animal feed	New Zealand
Grain processing	New Zealand
Rice processing	Nigeria
Food irradiation	USA
Grain handling and marketing for export market development	USA
Listing of rice handling and processing manufacturers in foreign countries	USA
Manufacturers of rice handling/processing equipment	USA
Systems and equipment to assure an uninfested product (in flour)	USA
Grain dust explosion problems	Venezuela

Pest Control

Disinfectants for cereal grains	Belguim
Control of cowpea weevils	Cameroon
Grain storage rodent protection	Cameroon
Grasshoppers	Cape Verde
Aflatoxins and collection of survey samples	Costa Rica, Gambia
Chlorpyrifos-methyl residues in flour and baked goods	England
Rodent control	Honduras
Rodent control program for warehouses	Liberia
Influence of physical disturbances on insect reproduction	Mexico
Stored-grain insects	Mexico, USA
Aflatoxin detection methods	Morocco
Infestation of cereal products	Pakistan
Insect resistance to fumigation	Pakistan
<u>Prostephanus truncatus</u> (larger grain borer)	Tanzania, USA, Zimbabwe
Contaminant analysis of cereal products	USA
Diatomaceous earth	USA
Efficacy of liquid grain fumigants	USA
Ethylene dibromide residue in grain and grain products	USA
Infested grain in farm storage and insect fragments	USA(3)
Infested seeds for fluoroscope nondestructive testing	USA
Insect control in processed animal feeds	USA
Insect fragment count procedure and inspection of carlots of wheat for internal infestation	USA
Malathion surface application and degradation	USA
Methoprene treatment of wheat samples	USA

Methyl bromide fumigation of grain in Egypt	USA
Microbiological control in flour	USA
Slides on rodent control in grain storage structures	USA

Storage Methods, Procedures, and Equipment

Locating, designing, and building country grain elevators	Argentina
Silos, pneumatic transport, etc.	Argentina
Grain storage and drying	China
Shrinkage due to moisture loss	Colombia
Warehouse maintenance and sanitation	Dominican Republic
Grain storage	Ecuador, Liberia, USA(3)
On-farm grain storage facilities	Gambia
Small grain storage bins	Honduras
Grain storage, processing, and development	India
U.S. manufacturers of bins/silos	India
Seed bag manufacturers	Liberia
Warehouse storage of rice	Liberia
Bean storage	Rwanda
Cleaning wheat at a country elevator	USA
Concrete dome structures	USA
Controlled atmosphere in grain storage	USA
Drying and treating jute bags for paddy in Guyana	USA
Engineering aspects of grain storage	USA
Grain cleaning, fumigation, and storage	USA
Grain storage for refugee camps in Somalia	USA
Grain storage information in Spanish	USA
Possible overseas storage projects	USA
Resource material on grain storage	USA
Simple steel bin manufacturers	USA
Slides on soybean storage and postharvest technology	USA
Small metal silos in Central America	USA
Sorghum storage	USA
Storage structures in West Africa	USA
Underground storage and fumigation	USA
United Nations relief commodity storage	USA
Bulk density and angle of repose of grains	Zimbabwe

TABLE 11

VISITORS

<u>Name and Country</u>	<u>Purpose of Visit</u>
<u>1980</u>	
Dr. Kihada, Japan	Discuss grain storage and drying
Mr. Tao, Peoples Republic of China	Discuss grain storage and drying
Pierre Anglade, France	Discuss grain storage/stored-product insect problems
Harlan Shuyler, FAO	Discuss loss assessment methods
Gordon Yaciuk, Canada	Discuss grain storage and drying and PHDS services
Y. I. Park, Korea	Review postharvest activities, PHDS, and marketing aspects
William Stellman, Ken Stafford, Harry Fenwick, USA	Discuss FFGI activities
Edgardo Quisumbing, Philippines	Discuss food and feed processing
<u>1981</u>	
Doyle Jeon, Korea	Observe and discuss FFGI activities
F. L. Watters, Canada	Discuss current research on stored-product insect control
Jae Sal Lee, Korea	Observe and discuss FFGI activities
François Tremeaud, Switzerland	Discuss Kansas and U.S. agriculture in the world economy
Mr. Ting, Peoples Republic of China	Discuss grain drying problems
Paulette George, USA	Discuss PHDS operation
José Sanjines, Bolivia	Discuss FFGI activities, future technical assistance, stored grain research, PHDS, wheat pricing policy, food reserves, and institutional strengthening
Luis Moncada, Colombia	Discuss FFGI training programs on grain storage and feed manufacturing

<u>Name and Country</u>	<u>Purpose of Visit</u>
Barry Longstaff, Australia	Discuss computer simulation model for natural air drying of grains, stored-product insects, wheat in long-term storage, and use of inert gas
H. W. Kim, Korea	Observe and discuss FFGI activities and visit bulk grain storage facilities
M. Sison, Philippines	Discuss PHDS services
David Santamaría, Nicaragua	Discuss PHDS services and FFGI activities
A. N. Mphuru, Tanzania	Discuss PHDS services, post-production system/loss assessment, and upcoming Peace Corps volunteer training
S. A. Bida, A. M. Adetiro, O. Okusanya, Nigeria	Discuss PHDS services
S. S. Kim, Y. I. Han, Korea	Observe storage and handling facilities and discuss FFGI activities
Hadeif Hafaiedh, Tunisia	Discuss PHDS services
Alejandro Rivas Vidal, Mexico	Discuss grain storage and handling facilities
John Lacy, England	Discuss stored grain mold problems
Robert Skiles, USA	Discuss PHDS services and FFGI activities
Pat McCracken, Grace Haskins, USA	Conduct GAO review
Robin Wilkin, England	Study storage mites, present seminars, and observe storage systems (farm to export)
<u>1982</u>	
Moshe Calderon, Israel	Discuss stored-product entomology
Merle Esmay, USA	Observe and discuss FFGI activities
Joe Clayton, USA	Discuss FFGI activities
Mr. Kong, Korea	Discuss FFGI activities
V. R. Muthuveerappan, G. Ambalavanan, India	Observe and discuss postharvest grain programs

<u>Name and Country</u>	<u>Purpose of Visit</u>
Alfred Sawadogo, Burkina Faso	Discuss PHDS services, FFGI activities, and grain storage problems
Julio Gil Turnes, Nicasio Romero, Paraguay	Discuss FFGI activities
Kevin Walsh, Australia	Observe and discuss postharvest technology problems and programs including grain storage and associated problems, PHDS services, and FFGI activities
Peter Mulligan, Botswana	Discuss marketing and grain storage handling
Dr. Verma, USA	Discuss FFGI activities
Daniel Baraunpana	Discuss and obtain information regarding on-farm grain storage
Phocas Kayinamura, Rwanda	Discuss bean and grain drying and storage
Azim Abdalla, Sudan	Discuss FFGI activities
Robin Wilkin, England	Discuss stored-product pest problems
Mr. Makoni, Dr. Dom, Zimbabwe	Discuss grain storage problems and preservation
Mrs. Martínez Ovozoco, Colombia	Discuss grain storage and preservation
J. O. Glatthaar, South Africa	Discuss grain storage and pest control
H. J. Banks, Australia	Discuss FFGI activities, International Symposium on Grain Storage and Controlled Atmosphere
<u>1983</u>	
D. J. Chung, Korea	Review FFGI activities in grain storage and marketing
B. H. Lee, Korea	Review FFGI activities in grain storage and marketing
José Orellana, Ecuador	Discuss future technical assistance and training
Vicki Schoen, Extension Specialist with experience in Africa	Discuss KSU and extension activities

<u>Name and Country</u>	<u>Purpose of Visit</u>
Jacob Ruegg, Switzerland	Discuss problems and solutions to postharvest losses with reference to tropical and subtropical countries
H. S. Lee, J. H. Chou, Korea	Review grain storage and marketing programs at KSU
D. L. Srivastava, India	Obtain information and costs of laboratory equipment, books, etc.
Adelis Arrevillagas, Venezuela	Discuss development of postharvest technology courses and curriculum
A. Pérez-Ordóñez, Honduras	Visit PHDS
Ahmed Ibrahim, Sudan	Visit PHDS
H. C. Yang, Korea	Discuss postharvest technology program
Rafael Pérez-Duverge, Joan Logan, Dominican Republic	Discuss developing-country storage problems at farm and commercial levels
Robert Smith, United Kingdom	Visit PHDS
D. A. Griffiths, D. R. Wilkin, David Pinniger, United Kingdom	Discuss FFGI activities
Fanny Bello, Manuel Rodríguez, José Zambrano, Antonio Landaeta, Venezuela	Discuss handling and quality assurance of imported grain and quality maintenance in storage
Raymond Audette, Canada	Visit PHDS and discuss development of grain storage projects at farm level in E. Africa
Jorge Isidro Soto, Orestes Vásquez, Freddy Starkman, Joel Yangaly, Joaquín Agurcia, Rafael Pietri-Oms, Honduras	Discuss exchange between Honduras and KSU in the areas of teaching, research, and extension
S. P. Chun, Korea	Discuss postharvest problems in Korea and FFGI activities
Mulyo Sidik, Indonesia	Follow up on Chung's trip to Indonesia
Brian Elder, Australia	Discuss aeration research and control for aeration
Robert Reinecke, South Africa	Discuss evaluation of grain marketing system for corn in South Africa
Shinji Nattori, Japan	Discuss role of cooperatives in U.S. grain marketing system

<u>Name and Country</u>	<u>Purpose of Visit</u>
Miguel Mora, Costa Rica	Visit PHDS, review CIGRAS project on postharvest systems
Robin Wilkin, United Kingdom	Discuss aspects of stored-product entomology
John Swanson, Egypt	Visit PHDS, discuss FFGI activities
Gary Lewis, Kenya	Discuss <u>Prostephanus truncatus</u> and use of neem, technical assistance, and training
<u>1984</u>	
A. Crochemore, A. Colas, France	Discuss grain storage and pest control in flour mills
Chang Joo Chung, Korea	Discuss and observe grain postharvest technology programs
Yousef Mian, Bangladesh	Visit PHDS
Zinul Abedin Khan, Bangladesh	Discuss FFGI research activities
Alejandro Silva, Costa Rica	Discuss and review a draft Memorandum of Understanding between FFGI and CNP
John Waller, New Zealand	Discuss research programs
Rasmy Zachary, Egypt	Discuss research programs
Larry Grace, USA	Discuss wheat storage
M. C. Gough, United Kingdom	Discuss heat transfer in stored grain
Carl Simpson, USA	Discuss rice drying and storage
Dayn Cederstrom, USA	Discuss bin design and aeration
Thomas Fricke, USA	Discuss on-farm grain storage
Josué Leos, M. Sifuentes, Mario Ramírez, Mexico	Visit FFGI laboratories and personnel
Harvey Hortik, AID/Washington	Review FFGI activities
Peter Barrer, Australia	Discuss research activities
Robin Wilkin, United Kingdom	Discuss aspects of stored-product entomology
Dr. Pushpamma, India	Discuss postharvest research

<u>Name and Country</u>	<u>Purpose of Visit</u>
Karlyn Eckman, Catholic Relief Services, Kenya	Discuss training and technical assistance programs
<u>1985</u>	
Romeo Cordóvez, Ecuador	Discuss FFGI activities
Simon Malo, Honduras	Discuss KSU capabilities in postharvest grain sciences
B. P. N. Singh, India	Observe and discuss postharvest technology training and research programs
Mansura Begum, Minhaj Ahmed, Bangladesh	Review PHDS activities
Carlos Benevides, Costa Rica	Discuss graduate programs on postharvest technology
Flavio G. Simoes, USA	Discuss fumigation techniques and flat storage unit
Damian Wamajie, Uganda	Discuss grain storage research in progress
M. E. Hassan Shazali, Sudan	Discuss cooperative research project in Sudan on grain storage
Simon Malo, Honduras	Discuss implementation of grain postharvest center at Zamorano, Honduras
M. Dhahbi, Tunisia	Discuss postharvest technology programs and curriculum at KSU and visit PHDS
Quentin West, Costa Rica	Discuss IICA's linkage with FFGI/AID and Zamorano postharvest project
Lawrence Mragwa, Kenya	Discuss grain storage research applicable to farm level situations
Raul Amantegui, Samuel Gaudelmann, Antonio Ochogavia, Chile	Discuss grain storage and marketing
Elizabeth Henson, England	Discuss data base organization with PHDS
Valdecir Dalpasquale, Brazil	Discuss possibilities of cooperative efforts with CENTREINAR
Natalie Hahn, Nigeria	Discuss PHDS services

<u>Name and Country</u>	<u>Purpose of Visit</u>
Brooke Greene, Bangladesh	Discuss PHDS services
Bonaventure Ntubitura, Andre Muhire, Marc Nzabakulikiza, Rwanda	Discuss grain storage and marketing
Jerzy Lipa, Poland	Discuss <u>Prostephanus truncatus</u>
Devendra Kuman Gupta, India	Observe and discuss grain posthar- vest programs
Miguel Angel Bonilla, Honduras	Discuss implementation of grain postharvest center at Zamorano, Honduras
<u>1986</u>	
Han Chul Yang, Korea	Discuss grain processing and food science programs at KSU

SECTION VII

NETWORKING ACTIVITIES

Networking is an important aspect of the activities of FFGI. By virtue of its location within the Department of Grain Science and Industry at KSU, FFGI has formed working relationships with other academic departments located on campus. Through shared appointments of its staff members, FFGI has direct contacts with the departments of Agricultural Economics, Agricultural Engineering, Entomology, and Grain Science. These contacts facilitate cooperation among faculty members and provide the opportunity for research projects to be carried out in the areas of grain drying, grain storage, loss assessment, insect control and behavior, and grain marketing systems. The training of international students in these areas has also been helpful in establishing contacts with the organizations for which these students work when returning home after completing their studies in the U.S. A summary of travel involving networking activities is shown in Table 12.

GASGA

Since 1974 FFGI has acted as AID's representative to the Group for Assistance on Systems relating to Grain After-harvest (GASGA). This group, which includes the member nations of West Germany, France, Canada, Great Britain, Australia, the Netherlands, the United States, and FAO, attempts to reduce food losses and increase the quantity and quality of food available to people in developing countries. As a GASGA member, FFGI hosted the annual meeting of GASGA in July 1975, sponsored a technical seminar on long-term storage of grains under arid tropical conditions in Washington, D.C., in May 1978, participated in the publishing of the GASGA Priorities for Action in Reducing Post-Harvest Losses in 1979, and hosted the GASGA Executive Meeting in June 1982. FFGI staff members have participated in the technical seminars sponsored by GASGA members, and have represented FFGI at the GASGA executive meetings.

Other

An agreement for Cooperative Research on Postharvest Technology in Grain Science between FFGI and Centro para Investigaciones en Granos y Semillas (CIGRAS) of the University of Costa Rica (UCR) was signed in January 1982 for the purpose of providing academic training at KSU and UCR for personnel of both institutions; initiating a training of trainers program; conducting research on grain drying, storage, and handling; carrying out postharvest loss assessment; establishing grain reserve programs; and developing a Latin American Postharvest Information Center. This ongoing cooperation with UCR was extended for another 4 years beginning in January 1985. FFGI staff members are currently assisting CIGRAS personnel in planning a project entitled "An Analysis of the Postharvest System for Grain and Pulses in Costa Rica."

FFGI has another link in Costa Rica with Consejo Nacional de Producción (CNP). In January 1985 a Memorandum of Understanding for Collaborative Research and Development was signed between these two institutions. The purpose of this understanding is to develop research activities of mutual interest and implement programs to address short- and long-term needs of both institutions.

Activities proposed under this program include grain handling, storing, processing, and marketing activities; price stabilization; grain grading; postharvest loss reduction; and training at the M.S. and Ph.D. levels.

FFGI and Instituto Interamericano de Cooperación para la Agricultura (IICA) have signed a General Agreement for Technical Cooperation on Postharvest Losses and Grain Marketing. The objectives of this agreement, signed in January 1985, are to strengthen the national institutions in Latin America and the Caribbean responsible for grain handling and marketing, promote better coordination by analyzing the current situation in each country, prepare research proposals and the financial management for implementing these proposals, and provide technical assistance to carry out these activities.

Another linkage that is currently being explored is the possibility of an exchange program allowing students at the Escuela Agrícola Panamericana (EAP) of Zamorano in Honduras to attend KSU and obtain undergraduate and graduate degrees. Faculty exchanges would also take place under this agreement. Officials from KSU and from Zamorano are currently discussing arrangements for such a program.

TABLE 12
NETWORKING ACTIVITIES

Travel Dates	Country	Personnel	Scope of Work
<u>1980</u>			
<u>1981</u>			
Jan. 18 - Jan. 30	Costa Rica	Julian	Review research and training possibilities under the cooperative agreement with UCR/CIGRAS.
June 10 - June 21	Netherlands	Pedersen	Attend GASGA executive meeting.
Aug. 22 - Aug. 30	Costa Rica	Chung Hugo Julian Kiser Pedersen	Develop a plan to conduct "An Analysis of the Postharvest Systems for Grains and Pulses in Costa Rica" in cooperation with UCR/CIGRAS.
<u>1982</u>			
June 18 - June 23	Singapore/ Philippines	Deyoe	Attend SEARCA Policy Advisory Board meeting.
July 5 - July 13	Costa Rica	Chung Phillips	Work with UCR personnel on analysis of postharvest grain systems in Costa Rica.
<u>1983</u>			
Jan. 22 - Feb. 6	Costa Rica	Chung Phillips Reed	Assist in planning the implementation of the CIGRAS project "An Analysis of the Postharvest Systems for Grains and Pulses in Costa Rica."
Apr. 14 - Apr. 16	Philippines	Deyoe	Brief USAID/Manila on SEARCA program.
Apr. 17 - Apr. 20	Singapore	Deyoe	Attend SEARCA Policy Advisory Board meeting.
Apr. 21 - Apr. 22	Philippines	Deyoe	Brief USAID/Manila on SEARCA Policy Advisory Board meeting.
June 18 - June 24	Egypt	Pedersen	Attend GASGA executive meeting.

<u>Travel Dates</u>	<u>Country</u>	<u>Personnel</u>	<u>Scope of Work</u>
<u>1984</u>			
<u>1985</u>			
Mar. 9 - Mar. 17	Costa Rica	Chung	Review and evaluate Phase I of CIGRAS postharvest research program, and assist in preparing a proposal for Phase II.
June 10 - June 21	Costa Rica	Phillips	Review results of CIGRAS research and marketing and post-production handling of basic grains in Costa Rica.
June 29 - July 6	England	Pedersen	Attend GASGA executive meeting.
July 7 - July 13	Costa Rica	Hugo	Collaborate with CIGRAS personnel on the ongoing project "An Analysis of the Postharvest Systems for Grains and Pulses in Costa Rica."
Aug. 11 - Aug. 15	Costa Rica	Hugo Phillips	Assist CIGRAS staff in the ongoing descriptive analysis of the postharvest grain systems in Costa Rica and discuss the need and time frame for the analysis of CNP.
<u>1986</u>			
Jan. 2 - Jan. 11	Costa Rica	Chung	Coordinate planning and funding of FFGI and CIGRAS activities for the CIGRAS Evaluation and Formulation of Postharvest Grain Loss Reduction Project

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APPENDIX I
LIST OF ANNUAL REPORTS

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Annual Report 1980-1981

Annual Report 1981-1982

Annual Report, Review of Activities, FY 1983

Annual Report, Review of Activities, FY 1984

Annual Report, Review of Activities, FY 1985

APPENDIX II

REVIEW OF ACTIVITIES

Cooperative Agreement
AID/DSAN-CA-0256

FY 1986

(July 1985 - February 1986)

Introduction

The allocation of FFGI staff members' time to the different activity categories is detailed in Table 1. These efforts are summarized below to indicate total time distribution by activity.

<u>Activity category</u>	<u>Person-Days</u>	<u>Percent</u>
Technical assistance	31.0	1.9
In-country training	135.5	8.2
On-campus training	232.0	14.0
Increase and maintain technical capabilities	588.5	35.4
Information services	194.5	11.7
Networking activities	59.5	3.6
Administrative support	<u>419.5</u>	<u>25.2</u>
Total	1660.5	100.0

Technical Assistance

Only one technical assistance activity was undertaken. This technical assistance assignment, as described below, is summarized in Table 2.

Chad

Upon request of USAID/N'Djamena, Dr. Carl Reed, grain storage specialist, and Mrs. Kathy Foster, linguist, traveled to Chad. The travel dates were January 18 through January 29, 1986.

The scope of work was to review the current situation involving storage of relief food commodities, to prepare a proposal for an in-country training course involving warehouse personnel, and to make preliminary arrangements for the presentation of the in-country training course.

The team discussed training needs with USAID/N'Djamena, World Food Programme (WFP), CARE/Chad, Red Cross-Red Crescent, and Government of Chad (GOC) National Cereals Office (ONC) personnel. Warehouses containing relief commodities were inspected and a record of sanitation conditions was made for use in training. A training site was selected, and sources of other training needs and supplies were identified.

A training proposal and a trip report were completed.

In-Country Training

In-country training programs were presented in three countries. A total of 207 participants from these countries received training in the area of grain storage management. A summary of the in-country training detailed below is given in Table 3.

Costa Rica

Upon request of the Centro para Investigaciones en Granos y Semillas (CIGRAS) and USAID/San José, Dr. Cornelius Hugo, agricultural economist, traveled to Costa Rica. The travel dates were July 7 through July 13, 1985.

The scope of work was to lecture and participate in the "Taller-Curso sobre Almacenamiento y Endurecimiento del Frijol" (Workshop-Course on Storage and Hardening of Beans).

This 4-day course, sponsored by CIGRAS and FAO, was attended by 32 participants and lecturers from Chile, Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Honduras, Mexico, Panama, and Venezuela. Dr. Hugo lectured on bean marketing.

Peru

Upon request of USAID/Lima, Mrs. Rosemary Burroughs, mycologist, Dr. Ekramul Haque, agricultural engineer, and Mr. Rafael Urrelo, entomologist/interpreter, traveled to Costa Rica. The travel dates were July 30 through August 27, 1985, for Mr. Urrelo; and August 8 through August 25, 1985, for Mrs. Burroughs and Dr. Haque.

The scope of work was to present two 1-week courses on postharvest handling and storage of grain (principally corn and rice). Each course was entitled "Curso Intensivo de Almacenamiento de Granos" (Grain Storage Short Course).

These 1-week courses were sponsored by the Proyecto Especial Alto Huallaga (PEAH), Universidad Nacional Agraria de la Selva (UNAS), and USAID/Lima. The first course was attended by 31 participants from government grain merchandising organizations, cooperative facility managers, UNAS faculty and students, Ministry of Agriculture inspectors, and PEAH subdirectors. The second course was attended by 24 participants including warehousemen, farmers, and UNAS technicians and students. The presentations of the various subject areas were adapted to give appropriate training in postharvest grain handling and storage to each group.

A training manual was prepared in Spanish.

Malaysia

Upon request of GASGA, Dr. Do Sup Chung, agricultural engineer, and Mr. Norman Teter, agricultural engineer, traveled to Malaysia. The travel dates were October 6 through October 13, 1985.

The scope of work was to present technical papers and participate in the International Seminar on Preserving Grain Quality by Aeration and In-Store Drying.

The 3-day workshop was sponsored by GASGA, Australian Centre for International Agricultural Research (ACIAR), National Paddy and Rice Authority (LPN), Malaysian Agricultural Research and Development Institute (MARDI), and ASEAN Food Handling Bureau (AFHB). It was attended by 120 participants from Australia, Bangladesh, Burma, England, Germany, Indonesia, Italy, Kenya, Korea, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Thailand, and USA. Twenty-four research papers related to objectives, principles, economics, and case studies of aeration and in-store drying were presented.

Dr. Chung presented two papers entitled "Physical and Thermal Properties of Grains" and "Grain Aeration and In-Store Drying in USA."

Mr. Teter presented a paper entitled "Preserving Grain Quality by Aeration and In-Store Drying."

A trip report was completed.

On-Campus Training

On-campus training activities are divided into three basic areas: (1) academic degree training in four disciplines, (2) the annual Grain Storage and Marketing Short Course (GSMSC), and (3) special short courses and programs which are presented upon request.

The four disciplines encompassed by FFGI academic training are agricultural economics, agricultural engineering, entomology, and grain science. FFGI sponsored academic training for two students during FY 1986: (1) Manuel Zeledón, Costa Rica, who is working on a Ph.D. degree in grain science, and (2) Carlos Benavides, Costa Rica, who is working on a Ph.D. degree in agricultural engineering. In addition, faculty members of FFGI advised and assisted some 14 graduate students sponsored by other national and international institutions who are working on degrees in fields concerned with postharvest storage, handling, and marketing practices. A list of persons trained on campus is given in Table 4.

A 1-day seminar on Prostephanus truncatus was presented on July 23, 1985, to 13 participants from 8 countries. The objective of this seminar was to encourage an information exchange between countries where the pest has been found. The names and countries of the participants are given in Table 5.

Increase and Maintain Technical Capabilities

The increasing and maintaining of technical capabilities by FFGI staff members involves two broad avenues of pursuit. The first of these is research activities directed towards gaining new knowledge. The second is attendance at professional and technical meetings for the purpose of broadening the knowledge base of the FFGI staff.

The research activities carried out by FFGI staff and graduate students are divided into the areas of grain storage and handling, and grain marketing. The specific research topics in each area are listed in Table 6.

FFGI staff members attending professional meetings are presented in Table 7.

Information Services

In order to be useful, research and technical assistance findings must be distributed to interested organizations and individuals in developing countries. This can be done in part by training, but only limited numbers of persons are reached in this way. To aid in the dissemination of information on postharvest grain systems, FFGI provides access to its Postharvest Documentation Service

(PHDS), prepares publications on activities carried out, and responds to requests for technical information. FFGI staff members also spend time with visitors to the KSU campus, explaining FFGI activities and discussing current and future projects involving FFGI and other organizations.

PHDS increased its acquisitions in FY 1986 by 670 documents, bringing the total number in the collection to 8,125. PHDS responded to 2,921 requests for searches and document copies, and has a total of 585 clients.

FFGI publishes technical assistance reports, research reports, and special reports. Other publications are written as circumstances require. In FY 1986, FFGI published five research reports and three other publications. A detailed list of publications is presented in Table 8.

FFGI publications are available for distribution upon request. In FY 1986 a total of 167 technical assistance reports, 96 research reports, and 49 special reports were distributed. In addition, 10 requests for technical information were received from 6 different countries. These information requests are detailed in Table 9.

A total of 24 visitors from 16 countries visited FFGI during FY 1986. The names, countries, and purpose of the visits are given in Table 10.

Networking Activities

The networking activities by FFGI in FY 1986 are described below and summarized in Table 11.

Costa Rica

Upon request of CIGRAS, Dr. Cornelius Hugo, agricultural economist, traveled to Costa Rica. The travel dates were July 7 through July 13, 1985.

The scope of work was to collaborate with CIGRAS personnel on the ongoing project "An Analysis of the Postharvest System for Grain and Pulses in Costa Rica."

Dr. Hugo worked with CIGRAS personnel on the ongoing Grain Postharvest Loss Assessment Study, and discussed future technical assistance cooperative efforts in Panama and Honduras.

A trip report was completed.

Costa Rica

Upon request of CIGRAS, Dr. Cornelius Hugo, agricultural economist, and Dr. Richard Phillips, agricultural economist, traveled to Costa Rica. The travel dates were August 11 through August 15, 1985.

The scope of work was to assist CIGRAS staff with the ongoing descriptive analysis of the postharvest grain systems in Costa Rica and discuss the need and time frame for the analysis of CNP.

The team assisted CIGRAS personnel in the interpretation and preparation of preliminary results of the study for presentation to officials from the Ministry of Planning, Instituto Interamericana de Cooperación para la Agricultura (IICA), Consejo Nacional de Producción (CNP), USAID, and the University of Costa Rica (UCR).

Discussions were held with USAID officials in regard to the ongoing postharvest systems survey, its results, implications, and follow-ups, as well as the need for an in-depth analysis of CNP.

A trip report was filed.

Costa Rica

Upon request of CIGRAS, Dr. Do Sup Chung, agricultural engineer, traveled to Costa Rica. The travel dates were January 2 to January 11, 1986.

The scope of work was to discuss a coordinated plan between FFGI and CIGRAS for a companion research proposal to the CIGRAS Evaluation and Formulation of Postharvest Grain Loss Reduction Project and to determine possible funding of the proposed FFGI activity.

Dr. Chung attended three meetings held at CNP to discuss a coordinated plan between FFGI, CIGRAS, and CNP for the research proposal on Evaluation and Formulation of Postharvest Grain Loss Reduction Programs in Costa Rica, various training programs proposed by CNP under the Memorandum of Understanding signed between FFGI and CNP, and also possible technical assistance from FFGI for drafting a scope of work of the proposed evaluation directed at improving CNP's administrative and operational efficiency.

A trip report was completed.

TABLE 1
TIME DISTRIBUTION
(Person-Days)

Name	Technical Assistance	In-Country Training	On-Campus Training	Increase and Maintain Technical Capabilities	Information Services	Networking Activities	Administrative Support	Total
STAFF								
Borsdorf	-	-	23.0	11.5	7.5	-	114.5	156.5
Burroughs	-	35.5	47.0	23.0	4.5	4.0	6.0	120.0
Chung	-	13.0	12.5	14.5	13.0	17.5	11.0	81.5
Dungey	-	-	-	-	-	2.5	125.0	127.5
Foster	9.0	16.0	31.5	3.0	11.5	1.5	39.5	112.0
Haque	-	34.0	9.5	91.0	4.5	-	3.0	142.0
Hugo	9.0	8.0	-	44.5	3.0	9.5	24.0	98.0
Muth	-	-	-	41.0	-	-	-	41.0
Pedersen	-	-	18.0	23.5	9.5	15.5	11.0	77.5
Peters	12.0	8.5	15.5	22.0	0.5	1.0	75.0	134.5
Phillips	1.0	-	20.0	91.5	-	5.0	1.5	119.0
Reed	-	15.0	7.0	121.0	-	-	-	143.0
Schenck-Hamlin	-	-	-	-	134.0	-	-	134.0
Shuyler	-	-	9.0	24.0	-	-	-	33.0
Wright	-	0.5	39.0	78.0	6.5	3.0	9.0	136.0
Subtotal	<u>31.0</u>	<u>130.5</u>	<u>232.0</u>	<u>588.5</u>	<u>194.5</u>	<u>59.5</u>	<u>419.5</u>	<u>1,655.5</u>
CONSULTANTS								
Teter	-	5.0	-	-	-	-	-	5.0
Subtotal	<u>-</u>	<u>5.0</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>5.0</u>
TOTAL	31.0	135.5	232.0	588.5	194.5	59.5	419.5	1,660.5

TABLE 2

TECHNICAL ASSISTANCE

Travel Dates	Country	Personnel	Scope of Work
Jan. 18-29, 1986	Chad	Reed Foster	Review current storage situation of relief commodities, prepare a training proposal, and make preliminary arrangements for presentation of an in-country short course.

TABLE 3
IN-COUNTRY TRAINING

Course Dates	Country	Participants	Personnel	Scope of Work
July 8-12, 1985	Costa Rica	32	Hugo	Participate and lecture in the Taller Curso sobre Almacenamiento y Endurecimiento del Frijol (Workshop-Course on Storage and Hardening of Beans).
Aug. 12-16, 1985	Peru	31	Burroughs	Present the Curso Intensivo de Almacenamiento de Grancs (Grain Storage Short Course).
Aug. 19-23, 1985	Peru	24	Haque Urrelo	
Oct. 6-13, 1985	Malaysia	120	Chung Teter	Present papers at the International Seminar on Preserving Grain Quality by Aeration and In-Store Drying

TABLE 4
ON-CAMPUS TRAINING

Country	Name	Subject
<u>Academic Training</u>		
Egypt	A. Hashem	Agricultural economics
Honduras	A. Reyes	
Nigeria	C. Agbo	
China	A. Song	Agricultural engineering
Indonesia	B. Kanujoso	
Costa Rica	C. Benavides	
	R. Flores	
Sudan	A. Itto	Entomology
USA	R. Sweet	
Costa Rica	M. Zeledón	Grain science
Honduras	J. Espinal	
	L. Pinel	
Pakistan	N. Ullah	
Saudi Arabia	H. Almaná	
Sudan	L. Wongo	
Venezuela	A. Arrevillagas	

TABLE 5
RESEARCH ACTIVITIES

Grain Storage and Handling

Evaluation of grain cleaners
Grain aeration under humid air conditions
Resistance to airflow through rough rice
Resistance to airflow through grain sorghum
Estimating populations of stored-grain insects
Evaluation of methoprene as a grain protectant
Factors affecting storage of sorghum
Tricalcium phosphate as an insect inhibitor
Comparison of three methods of maize storage in Honduras
Use of aspiration as a means of cleaning grain and/or sampling
Early detection of insects in bulk stored grain
Natural convection grain dryer design for Upper Huallaga region of Peru
Bibliography of plant materials for control of stored-product insects
Moisture sorption and quality losses in bagged grains stored under tropical conditions
Effect of temperature changes on rice weevil

Grain Marketing

Improvement of grain marketing systems in LDCs
Analysis of food security programs in LDCs
Quantitative analysis to support LDC grain policies
Computerized system for feasible agribusiness development
Economic analysis

TABLE 6

PROFESSIONAL AND TECHNICAL MEETINGS

Travel Dates	Personnel	Location	Type of Meeting
Sep. 3-6, 1985	Pedersen	Brainerd, Minnesota	Association of Operative Millers Food Protection Committee meet- ing
Dec. 17-20, 1985	Chung Haque	Chicago, Illinois	Winter Meeting of American Society of Agricultural Engineers

TABLE 7
PUBLICATIONS

Author	Title	
<u>FFGI Research Reports</u>		
Apolonio Guevarra, Charles Deyoe, Do Sup Chung	A Straw-Fired Furnace for Grain Drying Purposes	
Zenaida Toquero	Institutional Factors Affecting Rice Postharvest Practices in the Philippines	
Christopher Agbo, Richard Phillips	Alternative Grain Stabilization Programs for Nigerian Food Security	
63	Sang Ha No, Charles Deyoe, Do Sup Chung, In K. Han	Potential Uses of Grain Sorghum for Formula Feeds in Korea
Kyung Kyu Park, Do Sup Chung, Robert McElhiney	User's Guide of Computer Program for Feed Mill Design	
<u>Other Publications</u>		
Do Sup Chung, Chong-Ho Lee	Physical and Thermal Properties of Grains (paper presented at the seminar on Preserving Grain Quality by Aeration and In-Store Drying)	
Do Sup Chung, Boma Kanujoso, Larry Erickson, Chong-Ho Lee	Grain Aeration and In-Store Drying in USA (paper presented at the seminar on Preserving Grain Quality by Aeration and In-Store Drying)	
Norman Teter	Design Parameters for Storage and Handling Systems for Grain (paper presented at the seminar on Preserving Grain Quality by Aeration and In-Store Drying)	

TABLE 8
TECHNICAL INFORMATION REQUESTS

Subject	Country
Grain properties	USA
Grain marketing	Costa Rica
Bean storage	Rwanda
Aflatoxin survey methods	Costa Rica
<u>Prostephanus truncatus</u>	USA
Bulk density and angle of repose of grain	Zimbabwe
Aflatoxin detection methods	Morocco
Grain dust explosion problems	Venezuela
Postharvest training programs	Costa Rica
Methyl bromide fumigation of grain in Egypt	USA

TABLE 9

VISITORS

Dates	Name and Country	Purpose of Visit
July 22-25, 1985	Mansura Begum, Minhaj Ahmed, Bangladesh	Review PHDS activities
July 25-26, 1985	Carlos Benavides, Costa Rica	Discuss graduate programs on postharvest technology
Aug. 8-12, 1985	Flavio G. Simoes, USA	Discuss fumigation techniques and flat storage unit
Aug. 12, 1985	Damian Wamajie, Uganda	Discuss grain storage research in progress
Aug. 21-30, 1985	M. E. Hassan Shazali, Sudan	Discuss cooperative research project in Sudan on grain storage
Aug. 1985	Simon Malo, Honduras	Discuss implementation of grain postharvest center at Zamorano, Honduras
Sep. 10, 1985	M. Dhahbi, Tunisia	Discuss postharvest technology programs and curriculum at KSU and visit PHDS
Sep. 23-24, 1985	Quentin West, Costa Rica	Discuss IICA's linkage with FFGI/AID and Zamorano postharvest project
Sep. 30, 1985	Lawrence Mragwa, Kenya	Discuss grain storage research applicable to farm level situations
Sep. 29-Oct. 2, 1985	Raul Amantegui, Samuel Gaudelmann Antonio Ochogavia, Chile	Discuss grain storage and marketing
Oct. 1, 1985	Elizabeth Menson, England	Discuss data base organization with PHDS
Oct. 7-9, 1985	Valdecir Dalpasquale, Brazil	Discuss possibilities of cooperative efforts with CENTREINAR

TABLE 9 (cont.)

Dates	Name and Country	Purpose of Visit
Oct. 13-14, 1985	Natalie Hahn, Nigeria	Discuss PHDS services
Oct. 13-14, 1985	Brooke Greene, Bangladesh	Discuss PHDS services
Oct. 24-26, 1985	Bonaventure Ntubitura, André Muhire, Marc Nzabakulikiza, Rwanda	Discuss grain storage and marketing
Nov. 25, 1985	Jerzy Lipa, Poland	Discuss <u>Prostephanus truncatus</u>
Nov. 26-Dec. 13, 1985	Devendra Kuman Gupta, India	Observe and discuss grain postharvest programs
Dec. 16, 1985	Miguel Angel Bonilla, Honduras	Discuss implementation of grain postharvest center at Zamorano, Honduras
Jan. 30-31, 1986	Han Chul Yang, Korea	Discuss grain processing and food science programs at KSU

TABLE 10
NETWORKING ACTIVITIES

Travel Dates	Country	Personnel	Scope of Work
July 7-13, 1985	Costa Rica	Hugo	Collaborate with CIGRAS personnel on the ongoing project "An Analysis of the Postharvest System for Grain and Pulses in Costa Rica."
Aug. 11-15, 1985	Costa Rica	Hugo Phillips	Assist CIGRAS staff in the ongoing descriptive analysis of the postharvest grain systems in Costa Rica and discuss the need and time frame for the analysis of CNP.
Jan. 2-11, 1986	Costa Rica	Chung	Coordinate planning and funding of FFGI and CIGRAS activities for the CIGRAS Evaluation and Formulation of Postharvest Grain Loss Reduction Project

APPENDIX II
REPORT ON LANGUAGE SERVICES PROVIDED

Beginning in June of 1978, the Food and Feed Grain Institute (FFGI) has had a resident linguist on its staff. Starting at this time, FFGI has provided its own written translations of teaching and training materials, correspondence, and contracts, as well as simultaneous interpretation for short courses and conferences and translation services for in-country technical assistance assignments. Various types of language services and assistance have been provided to developing countries by the FFGI staff, as will be detailed herein.

Technical Assistance

When FFGI staff members are assigned to respond to a technical assistance request in a country where English is not spoken, a staff member who speaks the language is assigned to the request, or the staff linguist accompanies the group. FFGI is fortunate to have several Spanish-speaking persons among its personnel, and these staff members generally do not require the services of a translator on technical assistance assignments to Spanish-speaking countries. However, for technical assistance requests from French-speaking countries, the staff linguist often accompanies the technical assistance team to provide language services necessary for the successful completion of the assignment. The following list presents some examples of technical assistance requests in non-English speaking countries, with FFGI staff members providing translation services.

Panama, August-September 1980

Roe Borsdorf and Cornelius Hugo were assigned to the team, with Hugo providing for language needs. The team assessed the impact of different marketing conditions on the success of a proposed commodity program. A working paper was prepared for USAID/Panama.

Rwanda, February 1981

Dansou Kossou and Robert Mills were assigned to the team, with Kossou providing for language needs. The team visited GREMARWA storage facilities and evaluated the condition of the warehouses and equipment.

Bolivia, August-September 1981

Roe Borsdorf, Elmer Heyne, Cornelius Hugo, Wilfred Pine and Carl Stevens were assigned to the team, with Hugo providing for language needs. The team conducted a study on wheat production and associated marketing problems in Bolivia. The resulting report was translated into Spanish.

Haiti, December 1981

Dansou Kossou and Richard Phillips were assigned to the team, with Kossou providing for language needs. These staff members were part of a 9-person review team which determined food security reserve needs in Haiti.

Senegal, August-September 1982

Roe Borsdorf and Kathy Foster were assigned to the team, with Foster providing for language needs. The team conducted a survey of cereal reserve requirements under the Cereal Price Stabilization and Food Grain Reserve Component of the ESF Grant.

El Salvador, October 1982

Cornelius Hugo was invited to attend the First National Storage Congress held in San Salvador and presented by CEGRAS. Hugo also presented a paper at the meeting.

Ecuador, October 1982

Alden Ackels and Cornelius Hugo were assigned to the team, with Hugo providing for language needs. The team assessed the potential for blending soft and hard wheats in the mill mix, and conducted a study of wheat production, marketing and processing. The resulting reports were translated into Spanish.

Costa Rica, January-February 1983

Do Sup Chung, Richard Phillips and Carl Reed were assigned to the team, with Reed providing for language needs. The team conducted an assessment of postharvest grain losses, the grain and pulse handling and storage systems, and training needs.

Peru, January-February 1983

Cornelius Hugo and Harold Stryker were assigned to the team, with both providing for language needs. The team conducted an evaluation of training needs and gathered information on grain drying equipment and storage capacity needs.

Haiti, November-December 1983

Roe Borsdorf and Kathy Foster were assigned to the team, with Foster providing for language needs. The team conducted a study on the edible oil and fat sector in Haiti under the PL 480 Title III project.

Peru, May-June 1984

Harold Stryker and Walter Heid were assigned to the team, with Stryker providing for language needs. The team developed an emergency grain storage plan and assisted the Government of Peru in developing recommended operational plans to address grain drying and storage needs.

Guatemala, September 1984

Carl Reed and Harold Stryker were assigned to the team, with both providing for language needs. The team evaluated on-farm harvesting methods and storage systems for basic grains.

El Salvador, September-October 1984

Harold Stryker was assigned to this request. He evaluated and provided recommendations for on-farm storage and drying.

Honduras, January-February 1985

Cornelius Hugo and Richard Phillips were assigned to the team, with Hugo providing for language needs. The team reviewed, evaluated and made recommendations for agricultural marketing of basic grains through cooperatives.

Ecuador, March-June 1985

Harold Stryker was assigned to this request. He evaluated existing technical problems in ENAC grain plants, recommended management strategies for drying and storing grain, and recommended technical improvements for ENAC facilities.

Chad, January 1986

Kathy Foster and Carl Reed were assigned to the team, with Foster providing for language needs. The team reviewed the current situation of storage of food relief commodities, prepared a proposal for an in-country training program for warehouse personnel, and made preliminary arrangements for the training course.

Many technical assistance reports and research reports are written by FFGI staff members and consultants as a result of these and other technical assistance assignments. Several reports have been translated and are available for distribution. Others have been translated upon request of individuals or countries directly involved in the technical assistance, or by others who feel they can profit from the experiences of countries with similar needs and problems. FFGI feels it is important to provide this service for foreign nationals who do not speak or read English, but who would like to benefit from the knowledge and experience of FFGI researchers.

Anderson, Dale, Special Report 8, "Developing An Appropriate Grain Storage System" December 1978, French.

Bullard, Roger and Harold Stryker, Technical Assistance Report 100, "Improved Grain Storage and Pest Control in El Salvador, Evaluation and Recommendations" October 1984, Spanish.

Hugo, Cornelius, Technical Assistance Report 87, "Project Identification Mission: Assessment of Current and Future Technical Assistance and Training Needs of ENAC, Ecuador" October 1982, Spanish.

Hugo, Cornelius and Alden Ackels, Technical Assistance Report 86, "Project Identification Mission: Analysis of Current and Future Needs of the Wheat Milling and Baking Industries in Ecuador" October 1982, Spanish.

Hugo, Cornelius, Roe Borsdorf, Carl Stevens, Elmer Heyne and Wilfred Pine, "Wheat Production in Bolivia and Related Marketing Problems" October 1981, Spanish.

Hugo, Cornelius and Miguel Mora, "Current Situation, Training Needs, and a Training Program in Grains Postharvest for Personnel of IMA, Panama" March 1985, Spanish.

Pfost, Harry, Technical Assistance Report 25, "Observations and Recommendations for Construction of Feed Mills in Senegal, Mali and Mauritania" August 1971, French. Sent to the Commissariat à l'Aide Alimentaire, Dakar, Senegal.

Pfost, Harry, Technical Assistance Report 77, "Current Storage System for Domestic Grain in Senegal" March 1979, French. Sent to the Commissariat à l'Aide Alimentaire, Dakar, Senegal.

Phillips, Richard and L. Orlo Sorenson, Special Report 6, "Food Grain Reserves in Developing Countries" March 1978, French.

Stryker, Harold, Technical Assistance Report 104, "Review and Recommendations for ENAC Grain Plants, Ecuador" August 1985, Spanish.

In-Country Training

For training programs presented in-country in Latin America or Africa, the manuals are prepared in Spanish and French for the use of the participants. The following training programs and manuals have been prepared in translation, with simultaneous interpretation provided by FFGI personnel in many cases.

Haiti, January-February 1979

Short Course on Grain Preservation and Storage Management, for 40 participants. Manual in French, 272 pages. Simultaneous interpretation provided in-country by Francis Bolduc.

Costa Rica, August 1979

Grain Storage and Management Short Course, for 14 employees of the Consejo Nacional de Producción. Manual in Spanish, 161 pages. Simultaneous interpretation provided in-country by Carl Reed.

Senegal, September-October 1980

Trainers Course on Grain Preservation and Storage Management, for 15 participants from ONCAD. Manual in French, 205 pages. Simultaneous interpretation provided in-country by Kathy Foster and Dansou Kossou. This manual was also sent to Francis Bolduc, UNDP/FAO, in Bamako, Mali.

Rwanda, February-March 1981

Grain Storage Seminar for Storage Managers, for 26 participants from GREARWA. Manual in French, 141 pages. Simultaneous interpretation provided in-country by Dansou Kossou.

Upper Volta, May-June 1982

Trainers Course on Grain Preservation and Storage Management, for 15 participants from OFNACER. Manual in French, 249 pages. Simultaneous interpretation provided in-country by Kathy Foster and Dansou Kossou.

Honduras, September-October 1983

Course on Grain Storage and Preservation, for 43 participants from IHMA and the private sector. Manual in Spanish, 553 pages.

Costa Rica, January-February 1984

Grain Storage and Management Short Course, for 25 participants from CIGRAS and CNP. Manual in Spanish, 621 pages.

Honduras, May 1984

Rice Technology Course, for 35 participants from the private and public sectors. Manual in Spanish, 292 pages.

Peru, May 1984

Grain Handling, Conditioning and Storage Short Course, for 35 participants from UNAS, ENCI and ECASA. Manual in Spanish, 553 pages.

Guatemala, September 1984

Short Course on Grain Storage and Processing on the Farms of Altiplano, for 33 participants from DIGESA, ICTA and INDECA. Manual in Spanish, 97 pages.

Peru, August 1985

Grain Storage Short Course, for 60 participants from UNAS and PEAH.
Manual in Spanish, 277 pages.

On-Campus Training

The major training program held on the KSU campus is the Grain Storage and Marketing Short Course, presented annually since 1970. This year represents the sixteenth year that the course has been offered to participants from developing countries around the world. All instruction is given in English with simultaneous interpretation into French and Spanish. Since 1977, 159 participants from 26 countries have required the interpretation and translation services furnished by the FFGI translators in order to obtain their training at KSU. The breakdown of these participants is shown by year and country:

<u>1977</u>	<u>1978</u>	<u>1979</u>
Chad (FR) 2	Colombia (SP) 1	Costa Rica (SP) 1
Colombia (SP) 3	Ecuador (SP) 4	Upper Volta (FR) 5
Costa Rica (SP) 2	El Salvador (SP) 3	
El Salvador (SP) 2	Haiti (FR) 1	
Honduras (SP) 3	Mexico (SP) 1	
Mauritania (FR) 1	Panama (SP) 4	
Mexico (SP) 2	Senegal (FR) 9	
Panama (SP) 1	Tunisia (FR) 5	
<u>1980</u>	<u>1981</u>	<u>1982</u>
Burundi (FR) 3	Cameroon (FR) 1	Morocco (FR) 2
Costa Rica (SP) 1	Costa Rica (SP) 1	Paraguay (SP) 3
Ecuador (SP) 1	El Salvador (SP) 2	Rwanda (FR) 1
Honduras (SP) 3	Honduras (SP) 4	Togo (FR) 2
Mali (FR) 1	Mexico (SP) 4	
Mexico (SP) 2	Rwanda (FR) 1	
Nicaragua (SP) 1	Senegal (FR) 4	
Togo (FR) 1		
Upper Volta (FR) 6		
<u>1983</u>	<u>1984</u>	<u>1985</u>
Burundi (FR) 1	Burundi (FR) 2	Congo (FR) 3
Ecuador (SP) 4	Costa Rica (SP) 1	Costa Rica (SP) 3
Honduras (SP) 4	Ecuador (SP) 5	Guatemala (SP) 5
Peru (SP) 6	Guatemala (SP) 5	Honduras (SP) 5
Venezuela (SP) 1	Honduras (SP) 8	Mexico (SP) 4
	Mali (FR) 1	Rwanda (FR) 1
	Morocco (FR) 3	Zaire (FR) 1
	Zaire (FR) 2	

Since 1980, one of the duties of the staff linguist has been to interview and select local translators to serve as interpreters in the short course. These translators have been hired at a cost of \$20-30 per hour, and this has resulted in a substantial savings over the former practice of relying on State Department interpreters, who charge \$150 for one-half day (4 hours), with overtime

for anything beyond that time. This practice has proven itself to be valuable both in terms of finances and quality of interpretation.

The major portion of the training materials for the Grain Storage and Marketing Short Course is included in a two-volume set of manuals. These manuals are annually reviewed and updated, as instructors revise the material to be presented in the course, and make changes to improve the instruction and make the course more beneficial to the participants. The manuals are then translated accordingly into Spanish and French, so that all participants receive the same information in the same format, regardless of their native languages. The set of manuals, distributed to each participant, consists of the following:

Storage Manual, translated into French and Spanish, 553 pages.

Marketing Manual, translated into French and Spanish, 214 pages.

In addition to being distributed to all participants in the Grain Storage and Marketing Short Course, copies have also been distributed to individuals for use in their home countries in various training activities and as a reference and information source. The French version has gone to Dansou Kossou, Benin, and N'Dir Mboye, Senegal. The Spanish version has gone to Dr. Moreno, University of Mexico.

Many other written materials pertaining to the Grain Storage and Marketing Short Course are translated into French and Spanish to facilitate their use with participants from developing countries. Since 1982, a brochure advertising the short course, distributed around the world, has been sent to French and Spanish-speaking countries in their own language.

Beginning in 1981, form letters, a course outline and prospectus, and various registration forms have been sent to prospective students in translation so these materials can be more easily understood and used. All correspondence which comes from participants is translated into English for reply, then the reply is translated back into French or Spanish before being sent.

Welcome packets presented to participants on their arrival (including explanatory letters; a guidebook to the dormitory, campus and city; and a class schedule for the course) have been translated into French and Spanish since 1980.

Tests and class materials handed out to participants, as well as evaluation forms for the course, are translated into French and Spanish. The results of tests and evaluations are then translated back into English for assessment by FFGI staff members.

Outside reading materials for specific classes have also been translated into French and Spanish. To supplement Principles of Management and Principles of Operations, the book Managing for Greater Returns by Richard Phillips, Chapters I, III, IV, V, VI, VII, IX, XIII, XIV and XIX, have been translated into Spanish and French. The following articles have also been translated for use as supplemental materials for other marketing classes.

Black, William and James Haskell, "Marketing Alternatives for Agriculture, Vertical Integration through Ownership" French

- Borsdorf, Roe, "Agricultural Policy" French and Spanish
- Borsdorf, Roe, "Facilitating Market Operations" French and Spanish
- Borsdorf, Roe, "Financial Analysis" French and Spanish
- Borsdorf, Roe "Futures Marketing in Agricultural Commodities" French and Spanish
- Borsdorf, Roe, "Grain Transportation Planning" French and Spanish
- Borsdorf, Roe, "Introduction to Grain Futures Markets" French and Spanish
- Borsdorf, Roe, "Linear Programming" French and Spanish
- Borsdorf, Roe, "The Planning Process" French and Spanish
- Borsdorf, Roe, "Price Analysis" French and Spanish
- Borsdorf, Roe, "Price, Cost and Profit Analysis" French
- Borsdorf, Roe, "Simulation Programming" French and Spanish
- Borsdorf, Roe, "Storage Costs and Alternatives" French and Spanish
- Borsdorf, Roe, "Survey of Firm Design" French and Spanish
- Borsdorf, Roe, "Survey of Market and Economic Forecasting Procedures" French and Spanish
- Borsdorf, Roe, "Survey of Marketing Environment" French and Spanish
- Borsdorf, Roe, "Survey of Marketing Management" French and Spanish
- Borsdorf, Roe, "Transport and Locational Analysis" French and Spanish
- Brunk, Max, "Exposing Certain Marketing Myths" French and Spanish
- Drache, Hiram, "Market Planning" French and Spanish
- Schrader, Lee, "Vertical Organization and Coordination in the Broiler and Egg Subsectors" French
- Schruben, Leonard, "Lockset Method" French and Spanish
- Sporleder, Thomas and David Holder, "Marketing Alternatives for Agriculture, Vertical Coordination through Futures Contracts" French

For additional instruction in short courses, classes, and field trips, films are often shown to participants. In order that non-English speaking participants might derive the same information from these films, translations of film scripts have been made for films that are repeatedly shown to groups and classes. The following films have been translated into both French and Spanish.

Amazing Art of Flour Milling

American Rice

Born to Greatness - the Story of Union Equity

Grain Marketing at the Kansas City Board of Trade

Green Light for Grain

Make It Happen - Rice Council for Market Development

Photographic Sifter Study

Roller Mills in Action

Seeds of Survival (Agricultural Hall of Fame)

The Story of U.S. Rice

In addition to the annual Grain Storage and Marketing Short Course, other on-campus training courses are presented upon request. In March-April 1983, a Grain Handling, Conditioning and Storage Management Short Course was held at KSU. The six participants in the course were from Ecuador and were representatives of ENAC. The 471-page manual was prepared in Spanish for the use of the trainees.

In July-August 1984, an International Seminar on the Larger Grain Borer, Prostephanus truncatus, was held at KSU. A total of 24 people from Costa Rica, Guatemala, Honduras, Mexico, Sudan, USA, Zaire and Zambia participated in the seminar. Written materials were distributed in English, Spanish and French, and simultaneous translation into Spanish and French was provided.

In July 1985, a 1-day seminar on Prostephanus truncatus was again held on the KSU campus. A total of 13 participants from 8 countries attended the seminar, and simultaneous translation into Spanish and French was provided.

Increase and Maintain Technical Capabilities

As FFGI researchers continue to work on projects relating to developing countries around the world, technical information in the form of journal articles and other publications becomes important as the researchers try to orient their work towards the needs of specific countries. This information from these countries often is published in the language of the country involved, and in order for the researchers to be able to use this information, it must be translated into English. The FFGI linguistic staff has provided this service for a number of recent research projects, notably the work on Prostephanus truncatus which has become so important in a growing number of developing countries, both in Latin America and Africa.

A sample of the articles translated for research purposes, along with their original language, is given below:

- Bullard, Roger and Harold Stryker, "Improving Grain Storage and Pest Control in El Salvador, Evaluation and Recommendations" - English to Spanish
- Delgado, N. and R. Hernandez, "Control of the Larger Grain Borer" - Spanish to English
- Dragoni, I., C. Marino and R. Ravenna, "Molds of the Flours Used in Industrial Breadmaking" - Italian to English
- Ferreiral, W.A., et al., "Study of an Underground Silo as a Storage System for Bulk Corn" - Spanish to English
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Information Services

The Postharvest Documentation Service (PHDS) receives assistance from the FFGI linguistic staff in preparing abstracts and citations in English for non-English documents entered into the PHDS collection. Among the languages included are Spanish, French, German, Italian and Portuguese. Translation of articles into English or from English into other languages is done upon request of clients or researchers.

In addition to document translations, the PHDS brochure which advertises its services has been translated into French and Spanish for worldwide distribution to potential clients. All form letters and other correspondence sent and received from overseas clients are translated. The usage survey sent to all PHDS clients was translated into French and Spanish, and responses received were translated into English for tabulation and compilation.

Another service provided to PHDS by the FFGI linguist is a cooperative translation service used to benefit both PHDS and its clients, as well as the National Translation Center (NTC) in Chicago and its clients. Translations of non-English documents which are done by the FFGI linguist are submitted to PHDS, who in turn can submit them to NTC and receive a free search of the NTC data base for articles which may be useful to PHDS clients. This not only saves money for PHDS, but also makes available a larger number of translated articles to clients around the world who use the services of either PHDS or NTC.

In addition to all types of written translations available to foreign nationals, FFGI provides interpretation and escort services to visiting officials who do not speak English. An example of this is the 1982 visit of a government official from OPROVIA in Rwanda. The official was accompanied by the FFGI linguist on an 18-day study tour of the U.S., discussing grains and meat products, visiting areas of fruit and vegetable production and processing, and areas of peanut production.

SUMMARY

Through its staff members, FFGI has a number of well-trained individuals who can provide language services to aid in assistance programs for developing countries. These staff members have, through their background in science and agriculture, plus the many years of experience in the field and travels abroad, obtained a mastery of the technical vocabulary and terminology needed in this work. Such expertise is difficult to obtain at any price, but FFGI is able to call on its staff for excellent language services at little additional cost to those who need this assistance. The cost of translating training manuals and materials and the cost of providing simultaneous interpretation would often be prohibitive if done by hiring outside interpreters. In addition, outside interpreters often have no knowledge or experience in the subject matter at hand. The quality of the translation done by Institute staff members is better and is obtained at a more reasonable cost.

FFGI maintains most of its translations on floppy discs, so they can be revised and edited as needed, while still being retained on a permanent basis. Any and all of the materials discussed in this report are available for review, and can be sent out upon request.