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POSTHARVEST INSTITUTE FOR PERISHABLES

ACTIVITIES REPORT

**Postharvest Institute for Perishables
University of Idaho
Moscow, Idaho 83843**

**Cooperative Agreement AID/DSAN-CA-0265
Project Title: Storage and Processing of Fruits and Vegetables**

June 30, 1984 to September 30, 1985



University of Idaho

**in cooperation with
United States Agency for
International Development**

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**Prepared for the
United States Agency for International Development**

Robert L. Skiles, Director

TABLE OF CONTENTS

	PAGE
I. Introduction.....	1
II. Goals and Objectives of the Cooperative Agreement.....	3
III. Scope of Activities and Responsibilities.....	4
IV. Technical Assistance (General Technical Service).....	5
V. Training.....	8
A. Workshops, Seminars and Short Courses.....	8
B. Degree and Non-Degree Students.....	10
VI. Adaptive Research.....	12
VII. Information and Document Services.....	16
VIII. Reports and Bibliographies Published.....	21
IX. Miscellaneous Activities.....	24
A. NSF Evaluation.....	24
B. New Cooperative Agreement.....	24
C. PIP Management Information.....	24
D. The PIP Roster of Consultants.....	25

I. Introduction

This report is a review of activities in the Postharvest Institute for Perishables (PIP) for the period June 30, 1984 to September 30, 1985 under Cooperative Agreement AID/DSAN-CA-0265. This is also the last activities report to be issued because the Cooperative Agreement expired on September 30 after a five-year life of 1980-1985. Nearly all of the activities during the report period were directly related to the scope of work specified in the Cooperative Agreement and will be discussed individually in the sections that follow. At the end of the reporting period a new five-year Cooperative Agreement (AID/DAN-1323-A-00-5093-00) was executed between USAID and the University of Idaho.

During the years 1982-1984, considerable effort was made in PIP to acquaint the AID Missions and AID offices in Washington with the services that PIP could provide. The efforts were successful and numerous requests were received from the Missions for various types of assistance. A similar mode of operations with the Missions was followed during this report period with the result that much time and effort was spent on technical assistance and workshops for the Missions in the developing countries, and to the exclusion or near exclusion of other services that PIP had to offer.

The PIP Information Center (PIPIC) offers literature and documentation services to developing countries, and this activity has been in great demand during the report period as well as earlier. Approximately one-third of each PIP annual budget has been allocated to PIPIC and the demand for the latter's services in many developing countries has made it self-evident that the funds were well placed.

There were a few changes in the PIP core staff during the report period, as shown below:

Dr. Robert Skiles, Director

Dr. Robert Julian, Field Director, resigned on March 22, 1985

Mr. Harvey Neese, appointed Acting Field Director, June 11, 1985

Ms. Paulette George, Information Specialist

Ms. Gleanne Wray, Administrative Secretary

Ms. Christy Johnson, appointed Secretary/Records Manager,
August 6, 1984

Ms. Doris Kayser, Numerical Records Clerk, resigned June 28, 1985

Ms. Barbara Potratz, appointed General Typist, July 22, 1985

Mr. Joseph Dvorak, Micrographics Technician

The supporting staff of PIP is composed of the hundreds of experts and specialists in the many phases of postharvest technology of perishable crops whose names appear as consultants in the PIP computerized XPRT roster. These people are located at the University of Idaho and many other institutions, both public and private, around the world.

II. Goals and Objectives of the Cooperative Agreement

Cooperative Agreement AID/DSAN-CA-0265 between the U.S. Agency for International Development (AID) and the University of Idaho was negotiated on September 30, 1980, for the purpose of establishing the Postharvest Institute for Perishables (PIP) at the University. The goals and objectives are:

1. To increase the availability of fruits, vegetables, root and tuber crops, and to enhance the basic diet of people in developing countries by reducing postharvest food losses.
2. To reduce the costs of these perishable commodities by improving marketing efficiency.
3. To encourage the development of fruit, vegetable, root and tuber crop industries and processing.

III. Scope of Activities and Responsibilities

The means for attaining the defined goals and objectives of PIP are twofold:

1. PIP will function as an international base to organize General Technical Service teams that will identify, assess and reduce the problems associated with the storage, marketing and processing of perishable crops.
2. PIP, in conjunction with AID, will design projects on activities which will reduce food losses, reduce costs and improve market efficiency, and/or encourage and enhance economic growth through agribusiness development in the labor intensive perishable crops industries and through foreign exchange earnings from the export of these commodities.

The implementation methods for attaining these two goals fall into four distinct categories that will be addressed separately in the remainder of this report.

1. Technical assistance
2. Training
3. Information services
4. Adaptive research

IV. Technical Assistance (General Technical Service)

AID Missions and other agencies commonly refer to the General Technical Service as Technical Assistance (TA). During the period covered by this report, eight TA teams responded to Mission requests or participated in Mission-related projects requiring TA. Each team prepared a report for distribution to the appropriate people upon completion of a project.

1. "Considerations for Harvesting and Storage of Vegetables and Fruits in the Guatemala Highlands." Report No. PIP/Guatemala/Oct-Nov 84/No. 52.

A team of two people - a vegetable specialist and a storage specialist - provided assistance to the Small Farms Diversification Project of USAID/Guatemala in regard to the improvement of farm level harvesting and storage of fruits and vegetables in the western highlands of Guatemala.

2. "Marketing of Grenadian Spices in the U.S.A." Report No. PIP/Grenada/Nov 84/No. 53.

A consultant with expertise in spice marketing was requested by USAID/Grenada to assist Grenadian farmers and growers associations in serious marketing problems with nutmeg, cinnamon, cloves and mace. The consultant analyzed the situation in Grenada, then spent time in the U.S. identifying potential markets.

3. "Interviews With U.S. Spice Firms to Establish a Marketing Plan for Grenadian Nutmeg." Report No. PIP/Grenada/July 85/No. 53.2.

Two consultants were contracted by PIP to assist USAID/Grenada and to do additional work in the U.S. on the project described under 2, above. Meetings and discussions were held with four major nutmeg processing and marketing firms in the U.S. to identify constraints in the use of Grenadian nutmeg and ways to solve them.

4. "A Report on Production and Export of Selected Perishable Crops in the CBI Countries Requiring Quarantine Treatment for U.S. Entry." Report No. PIP/CBI/July-Sept 84/No. 54.

Two consultants were contracted by PIP to assist USAID/Washington in a determination of Caribbean export crops affected by the ban on the use of ethylene dibromide as an insecticidal fumigant. Data were collected and analyzed from five Caribbean exporting countries.

5. "Evaluation of Federación de Asociaciones de Productores y Exportadores Agropecuarios de Honduras (FEPROEXAH)." Report No. PIP/Honduras/Jan 85/No. 60.

Two consultants assisted USAID/Honduras in evaluation of FEPROEXAH's early operations directed toward regional agricultural diversification for export of perishable non-traditional crops from Honduras. Recommendations were made for future operations, particularly in regard to agricultural credit for the members of the association.

6. "Recommendations for Onion Production, Cultural Practices, Harvesting and Storage in Honduras." Report No. PIP/Honduras/Feb 85/No. 61.

An onion specialist contracted by PIP provided consulting services to USAID/Honduras on ways to improve onion production in Honduras. Onion production in the country is low, but could be improved significantly. Recommendations were made for methods to achieve the improvement.

7. "Recommendations for PITALPRO Library Improvement - Faculty of Science and Food Engineering, Ambato." Report No. PIP/Ecuador/Mar 85/No. 65.

The Information Specialist from PIP provided technical assistance to a USAID-funded project at the Technical University of Ambato in Ecuador. The Faculty of Science and Food Engineering required advice concerning faculty and administrative needs for computer accumulation and dissemination of technical information. It was recommended that at least one person from Ambato attend a training course in computer technology at the University of Idaho.

8. "Report of a Visit to the Dominican Republic." Report No. PIP/Dominican Republic/Sept 85/No. 73.

The Director of PIP visited the Mission, the Dominican Center of Export Promotions (CEDOPEX) and the Inter-American Institute for Cooperation in Agriculture (IICA) for the purpose of acquainting them with the various services that PIP could provide to different projects.

In the Cooperative Agreement covered by this report, PIP was able to provide - at its expense - up to twenty days of consultant time, transportation and per diem costs to a limited number of Missions upon request each year. The new Cooperative Agreement does not provide for PIP to offer this service. This program enabled PIP to assist Missions in examining new projects and subsequently provided an opportunity to be a part of future project work. Fast response and a minimum of paperwork made this program popular with AID Missions.

Because of the elimination of PIP-sponsored technical assistance in the new Cooperative Agreement to initiate new programs or evaluate ongoing ones, it is expected that there will be considerably less technical assistance requests in the future by AID Missions.

V. Training

Training activities done by PIP under the Cooperative Agreement fall into two categories: 1) workshops, seminars or short courses presented in-country or in the U.S. and 2) sponsored students for degree or non-degree training at a U.S. university. During the period June 30, 1984 to September 30, 1985 PIP presented four workshops in-country, and three in the U.S. Also, seven students were sponsored for all or some portion of their advanced degrees, and eight non-degree students were assisted by PIP.

A. Workshops, Seminars and Short Courses.

1. "A Short Course on Harvest and Storage of Vegetables and Fruits in the Highlands of Guatemala." Project: PIP/Guatemala/Mar 85/No. 52.2.

Two consultants presented a short course in Spanish at Mission request for Ministry of Agriculture personnel on harvesting and storage methods for temperate climate fruits and vegetables. The information was developed for small-scale farmers in the western highlands of Guatemala.

2. "Burundi Training Program in Food Preservation by Solar Drying with Supplemental Heat." Project: PIP/Burundi/Nov 84/No. 56.

Two specialists from the University of Idaho provided assistance to USAID/Burundi and the University of Burundi in presenting a training program for perishable food preservation. The course was attended by participants from Zaire, Madagascar, Mali, Chad, Togo and Senegal, as well as Burundi.

3. "Short Course on Postharvest Losses in Perishable Crops." Project: PIP/Honduras/Mar 85/No. 64.

Two postharvest loss and perishable crop management specialists were contracted by PIP to present a short course in Spanish to assist a USAID/Honduras project. Personnel from various governmental and quasi-governmental agencies received instruction in perishable crop management for export.

4. "Short Course on Mechanized Farming Practices and Operations, and Agricultural Management for Smaller Farm Units." Project 66: Egypt Agricultural Mechanization.

PIP collaborated with USDA/OICD and the Department of Agricultural Engineering at the University of Idaho in presenting a short course at UI for some Egyptian agricultural managers to learn agricultural mechanization, including handling and management of perishable crops.

5. "Solar Drying Workshop." Project 68: Solar Drying with Supplemental Heat - Food Preservation and Storage.

PIP collaborated with the Department of Agricultural Engineering and the School of Home Economics in presenting a workshop at the UI in the proper construction and use of solar dryers. The purpose was to train faculty in the UI and other qualified people in the region so they could form a resource pool of trainers who could respond to Mission requests for solar dryer training in-country.

6. "Postharvest Loss Reduction of Perishable Crops." Project 70: USDA/OICD Short Course TC 150-7.

PIP collaborated with USDA/OICD in the presentation of a short course at the University of Idaho for participants from Ivory Coast, Ecuador, Ethiopia, Egypt, Zambia, Pakistan and Indonesia. The participants received training in the technical and practical aspects of perishable crops management concerning harvesting, handling, packaging, processing, storage, transportation and domestic or export marketing.

7. "Food Preservation by Solar Drying." Project 72: Peace Corps Solar Dryer Training in Niger.

PIP provided the services of a solar dryer specialist from the University of Idaho to assist a Peace Corps project on food preservation in Niger. The results were less than desirable because of the inability of the Peace Corps team leader to relate to the project and its goals.

B. Degree and Non-degree Students

PIP supported, wholly or partially, seven developing country students during the period of this project.

1. Ms. Carmen Paterno (Philippines)

Department of Bacteriology and Biochemistry
University of Idaho

Expects to complete M.S. degree in May 1986 with a thesis on early identification of infection in mangoes by the anthracnose disease fungus.

2. Mr. Shahid Perwaiz (Pakistan)

Department of Agricultural Economics
University of Idaho

Completed M.S. degree in August 1985. Thesis: "Winter Season Demand for Fresh Vegetables: A Case Study of Cucumbers, Peppers and Tomatoes in the United States." Published by PIP as Research Report No. 2, PIP/Pakistan/June 85/No. 2R.

3. Mr. Nasrun Hasibuan (Indonesia)

Department of Agricultural Economics
University of Idaho

Completed M.S. degree in June 1985. Research Report: "Postharvest Losses Associated with Exports of Vegetables from Indonesia to Singapore." Published by PIP as Research Report No. 1, PIP/Indonesia/June 85/No. 1R.

4. Mr. Miguel Bastarrechea (Guatemala)

Department of Vegetable Crops
Cornell University

Will complete M.S. degree in June 1986. Thesis: "Postharvest Quality in Snow Peas." Acknowledgement of some support from PIP will be given in the thesis which will be published by Cornell University.

5. Mr. Rico Cruz (Philippines)

Department of Agricultural Engineering
University of Idaho

Studying for Ph.D. degree with research for thesis on onion storage.
Received some support from PIP.

6. Mr. Kiran Shetty (India)

Department of Plant, Soil and Entomological Sciences
University of Idaho

Expects to complete M.S. degree in May 1986, with thesis on respiration of potatoes in shrink-wrap packages. Partial support was provided by PIP for research purposes. PIP also assisted the student in locating private sector support from Cryovac Corporation for the research.

7. Mr. Alpha Bah (Gambia)

Department of Agricultural Economics
University of Idaho

This student was working toward a Master's degree but his academic standing became unacceptable so PIP terminated his support.

8. PIP provided assistance to fifteen students from developing countries who were studying for Bachelor's, Master's, or Ph.D. degrees at the University of Idaho under funds provided by AID or FAO. PIP assistance was principally in the form of staff time to orient the students, help them find faculty advisors and place them in various departments at the University of Idaho, and provide guidance as needed during the academic year. This assistance was given to students from Somalia, Rwanda, Egypt, Mauritania, Kenya, Burkina Faso, Cape Verde, Indonesia and Morocco.

In addition to the students in degree programs, PIP provided similar staff time assistance to eight short-term, non-degree participants from Indonesia, Somalia, Egypt, Mexico, Colombia and Algeria. They were funded by AID.

VI. Adaptive Research

During the period of June 30, 1984 to September 30, 1985 PIP became involved or continued to be involved in five adaptive research projects for developing countries. To a large extent the projects were unrelated, so they provided PIP with a wide base of adaptive research interest. None of the projects were completed by the end of the reporting period, so they carried over into the new Cooperative Agreement.

1. Solar cooling or refrigeration. One of the greatest and most frequently heard needs in developing countries is for economically feasible, appropriate technology cool storage or refrigeration for perishable crops after harvest. An adaptive research project was initiated on this topic in the Department of Chemical Engineering at the University of Idaho. Research is being done to develop a low-cost cooling unit that will operate in a water-zeolite system under partial vacuum and with no moving parts. It is hoped that an operational model will be completed and tested internally by late 1986. It is anticipated that it will then be ready to field test and demonstrate in a developing country situation.

2. Film wrap. Most developing countries are becoming increasingly aware of the economic importance to be derived for their countries by producing crops for an export market. A concomitant need is for an attractively packaged product that will have an acceptable shipping and shelf life. Film shrink wraps offer this advantage under certain conditions, so an adaptive research project was initiated on potatoes in the Department of Plant, Soil and Entomological Sciences at the University of Idaho.

It is anticipated that the potato research will serve as a model for developing countries to use in film wrapping fruits and vegetables other than those currently on the market. This project has generated some interest on the part of U.S. plastics film manufacturers and they have provided some funds and equipment. An M.S. candidate graduate student from India has been working on the project to obtain data for his Master's thesis.

3. Nutmeg from Grenada. After the political situation stabilized in Grenada, it was learned that there were at least 3000 metric tons of nutmegs stored in Grenada and for which there was a limited international market. PIP initiated an adaptive research project with the Department of Chemical Engineering at the University of Idaho to determine how AID could assist the Grenada Nutmeg Cooperative to market its product, principally in the U.S., and particularly to determine the reasons for the limited market for Grenadian nutmeg.

Preliminary physical and chemical studies at Idaho indicated that Grenadian nutmeg was demonstrably superior in some respects to Indonesian nutmeg. However, the product from Indonesia controls the world market.

PIP contracted two consulting specialists to meet with representatives of four U.S. spice companies - McCormick, Baltimore Spice, Durkee and Griffith Laboratories - to investigate the bases of the reported reluctance on the part of the companies to use Grenadian nutmeg and to plan some commercial tests or evaluations.

As a result of these efforts the U.S. firms agreed to collaborate with PIP in investigating or researching greater utilization of Grenadian nutmeg and one of the firms has subsequently requested a price quote for 25 tons. Also AID/Grenada has initiated a PIO/T for incremental funding of the project to complement the PIP core funds to a considerably larger extent.

4. Solar Dryer for Perishable Food Preservation. PIP has had an adaptive research and appropriate technology project on the use of solar dryers for perishable food preservation for more than three years. During that period faculty in the Department of Agricultural Engineering at the University of Idaho have continued to improve the design of the dryers and their highly desirable feature which is the use of supplemental heat. The latter permits day and night use of the dryers and in cloudy as well as sunny weather. This doubles their efficiency. Also, a food nutritionist in the School of Home Economics at the University continued to improve upon drying techniques for different foods.

During the reporting period PIP consultants presented workshops on the proper construction and use of solar dryers with supplemental heat in Burundi and at the University of Idaho. The workshop in Burundi was attended by participants from Zaire, Madagascar, Mali, Chad, Togo, Senegal and Burundi.

In mid-1983 two specialists from the University of Idaho presented a solar dryer workshop in the Philippines to local university extension people who subsequently taught the technology in three villages. One year later the Idaho specialist who had taught food handling and nutritional aspects of the solar dryers returned to the Philippines and observed that the village people were still effectively using their dryers.

5. Cassava Processing in Ghana. In Ghana, cassava is normally processed into a product called gari because of the extremely perishable nature of fresh cassava. Currently in that country there is a trend toward urbanization, so the urban demand for gari as a basic food is increasing. At the same time, the people remaining in the production areas are mainly left with the ancient, relatively inefficient methods of producing gari.

PIP initiated an adaptive research project in Ghana with a graduate student from Cornell University with experience in Ghana to study the various aspects of improved cottage industry processing technology of gari production to meet the growing demand without destabilizing the older, established economy. The student will use the results for his Master's thesis at Cornell.

6. Loss Assessment in Perishable Crops. PIP initiated an adaptive research project in 1983 directed toward the development of a methodology for loss assessment of perishable crops in developing countries. The need for a relatively simple, quick guide to loss assessments was evident from the lack of reliable data in the literature. PIP's initial work in this area was done by two consultants in collaboration with the Asian Vegetable Research and Development Center (AVRDC) in Taiwan.

During the reporting period of this report additional work was done in Taiwan in collaboration with the AVRDC and in the Philippines, Indonesia and

Thailand where the AVRDC has outreach programs. In each country, postharvest losses were observed in the local marketing systems and recommendations were made for the development of a methodology to assess the losses. Subsequently, a composite report was prepared in PIP that covered the causes of losses in that Southeast Asian area and the various measures that are needed to reduce those losses. Included in the recommendations is the development of a training guide for mid-level management personnel to assess their local losses from an economic viewpoint.

VII. Information and Document Services

This portion of the report covers the activities of the Postharvest Institute for Perishables (PIPIC).

The activities of the Information Center during the past 15 months will be discussed with particular emphasis on the level of fulfillment of requirements of the original cooperative agreement.

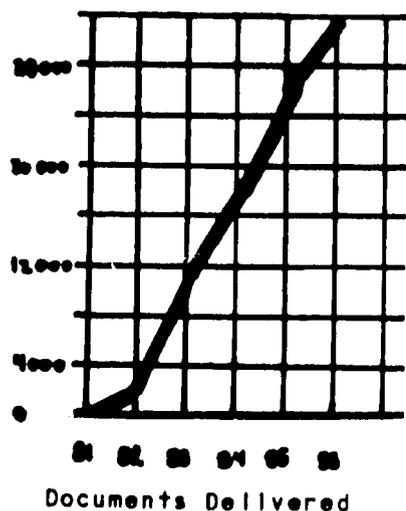
Collection Size: The collection was mandated to contain a minimum of 5000 documents at the end of the contract period. That goal was achieved in February 1983. There were 8,842 or 177% of the required number of materials at the end of this reporting period with 1,514 titles added since July 1984.

Documents in Collection

July 1981	922
July 1982	4,354
July 1983	5,875
July 1984	7,328
July 1985	8,697
Sept 1985	8,842

New additions to the collection are announced through New Titles which was published 4 times during this 15-month period with 2000 being distributed. Two issues contained abstracts in response to the recommendation of the NSF evaluation committee. Clients have been asked whether they prefer a reduced number of abstracted materials or the previous method. A final decision on abstracting will be made in early 1986.

Materials Distributed: There was only one requirement for materials to be



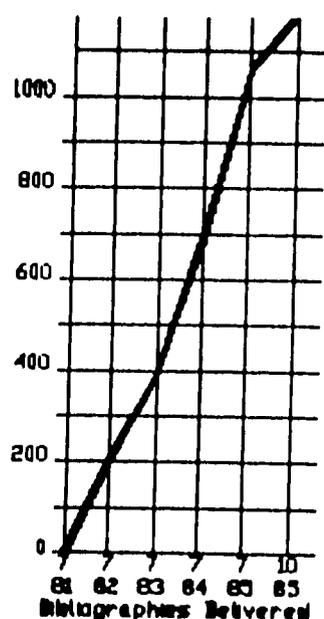
distributed in the cooperative agreement: specifically 2,000 documents were to be shared within the first year. That goal was reached in August, 1982 - two months before it was due. By October, 1982, 4,654 documents were distributed (233% of the requirement).

Within the last 15 months 10,667 documents have been distributed (approximately 700 per month). This brings the total number of documents distributed during the contract to 29,561. It is interesting to note that the ratio of microfiche to paper has held steady at 1:3 for the entire contract. This is due to a small number of libraries ordering great quantities. Approximately 99% of PIPIC users rely on paper copies.

Bibliographies were envisioned by the cooperative agreement to be major works which were to be printed and distributed in multiple copies around the world. During the last 15 months a bibliography was completed that related to irradiation: Ethylene Dibromide (EDB) Alternatives for Perishables, A Bibliography. In it are 215 items discussing the viability of alternatives to EDB as applied to various crops. This is the fourth such bibliography issued from the Information Center. A fifth is now in progress. The series is:

Roots & Tubers: A Postharvest Bibliography	1981
Export Marketing: A Bibliography	1983
Exotic Fruits: A Postharvest Bibliography	1983
EDB Alternatives for Perishables: A Bibliography	1985
Storage of Perishable Crops in the Developing World	1986

The Information Center, however, has greatly expanded the definition of



bibliography. While the major published ones serve the broad needs of many people, more often a single PIPIC user needs specific information on a much smaller topic. As a result, the PIPIC collection's database and those commercially available through Dialog and other vendors are regularly searched to create individualized bibliographies on demand. During the period 507 individual bibliographies were produced and distributed. This nearly doubles the total number sent in the 5 years which now totals 1183 bibliographies.

Some of the bibliographies which have been most frequently requested are those on solar dryers and appropriate-level food processing. Some of the more esoteric searches have included the nutrient composition of fig leaves and several other exotic fruits. One very challenging search included finding ways to extract butyric acid from peppers.

Clients Served: The Cooperative Agreement did not specify who was to be served by PIPIC. Over the years the contacts have continued to grow as can be seen from the following chart. On October 1, 1985, 801 clients were being served in 109 countries. This is an increase of 254 people and 8 countries in the last 15 months.

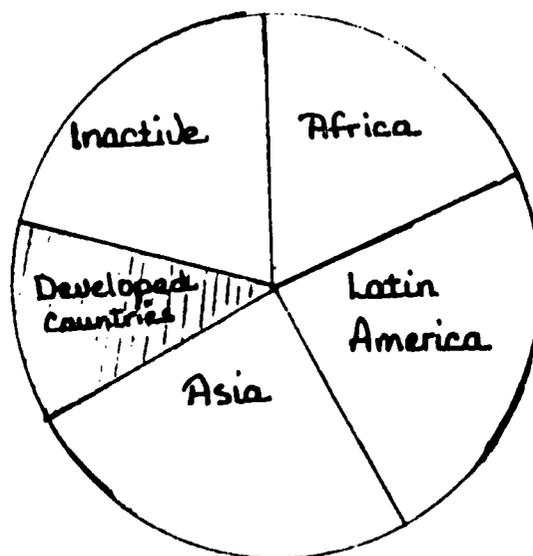
PIPIC Clientele

<u>Number of Clients</u>		<u>Number of Countries</u>
July 1981	12	8
July 1982	242	70
July 1983	327	90
July 1984	547	101
July 1985	767	108
Oct 1985	801	109

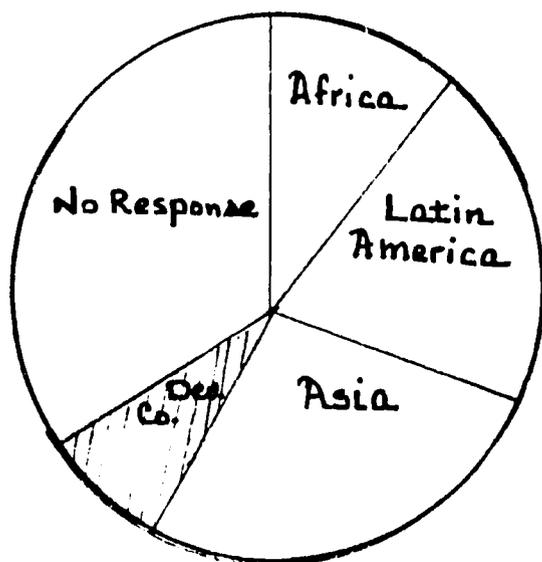
The following circular graph illustrates the geographic distribution of the PIPIC clients. Those who are "inactive" are clients from whom there was no correspondence for a period of 15 months. Before inactivating, a card is sent to each individual who is given a chance to remain active if desired.

This policy has resulted in 172 former clients being removed from current mailing lists. Approximately a dozen a year are reactivated as their work again focuses on postharvest perishables.

Those in developed countries (Western Europe, the USA, Japan, Australia and New Zealand) are primarily development workers in either government or private agencies within these countries. Roughly two dozen are fee-paying clients at this time. Plans are being made to increase this number and make PIPIC more self-sufficient.



Client Response to Services: There are two different forms of regularized feedback requested from PIPIC users.

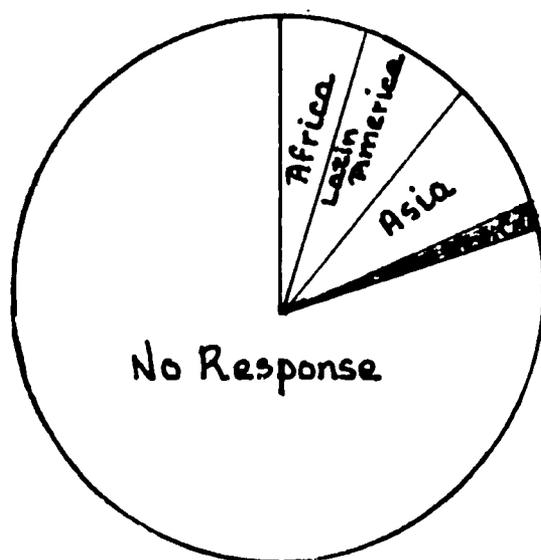


With each order, a postcard "Satisfaction Survey" is included. In the last year, 522 postcards were sent to clients with 345 or 66% being returned. The primary purpose of these postcards is to check whether the client received what was requested and to check on the physical quality of the materials. For example, 90% of the 223 receiving a bibliography said it was adequate with 9% judged as too general and one response of being too specific. Copy quality was judged to be "difficult to read" by 10%, and 1% said it was illegible. With the installation of the new reader-printer

last April, this should improve with the next year's report. Over half of those returning the cards used the space provided to add some kind of comment. Of these, 63% were "thank yous", but 20% used this to request more documents and another 16% requested bibliographies or other kinds of information. Uses of the information include: 75% for research, 33% each for teaching and extension, 20% go to a library, and there are 34 other kinds of uses in addition. (Since there can be more than a single use, these add up to more than a whole.)

The second kind of feedback is an annual survey distributed to all active users. The one distributed in September, 1984 was received through the spring of 1985. Only 121 of 601 clients returned this survey (20%). The most useful function was to ascertain for each returning client their own language abilities and the availability of microfiche equipment. This allows for better individualized service for the clients. Another major aid was areas of interest to users. These answers guide PIPIC collection development and decisions about the need for the major (printed) bibliographies. In this

year's survey, for example, 93 of the 121 returned surveys showed an interest in storage of crops in tropical conditions. This shows a strong need for more information on the topic. Alternately, only 20 of 121 were interested in irradiation. (This serves to validate the decision to change the major bibliographic topic to EDB alternatives rather than one on irradiation exclusively.)



Other Activities in PIPIC

PIP News, Volume 2, No. 1 was issued to approximately 1000 individuals and agencies. Budgetary constraints have put a moratorium on this general informational newsletter.

Paulette George co-authored a paper with Donna Schenck-Hamlin from the Post-Harvest Documentation Service (Kansas State University) for the Special Libraries Association Conference in Winnipeg, Manitoba in June, 1985. It was entitled, "Making High Technology Appropriate: How to Interface with a Developing Country Clientele."

Paulette George also consulted with various Pakistani libraries to organize a network to support water resources research. This was in cooperation with the Pakistan ISM/R project funded by USAID.

VIII. Reports and Bibliographies Published

During the reporting period of June 30, 1984 to September 30, 1985 PIP published 11 technical assistance reports, 5 workshop training guides, 1 general bibliography, 507 specialized bibliographies, and 2 research reports for Master of Science degrees.

A. Technical Assistance

1. Jones, James R. and Nasrun Hasibuan. Indonesia's Vegetable Marketing System, Exports and Postharvest Losses. PIP/Indonesia/July 84/No. 50.
2. Robertson, A.F. and D. Creech. Considerations for Harvesting and Storage of Vegetables and Fruits in the Guatemalan Highlands. PIP/Guatemala/Oct-Nov 84/No. 52.
3. Henry, Wayne. Marketing of Grenadian Spices in the U.S.A. PIP/Grenada/Nov 84/No. 53.
4. Neese, H.C. and Dr. Wayne Henry. Interviews with U.S. Spice Firms to Establish a Marketing Plan for Grenadian Nutmeg. PIP/Grenada/July 85/No. 53.2.
5. Brooks, Robert O. A Report on Production and Export of Selected Perishable Crops in the CBI Countries Requiring Quarantine Treatment for U.S. Entry. PIP/CBI/July-Sept 84/No. 54.
6. Harrison, Kelly M. and William E. Bolton. Evaluation of Federación de Asociaciones de Productores y Exportadores Agropecuarios de Honduras (FEPROEXAH). PIP/Honduras/Jan 85/No. 60.
7. Dessert, A.M. Recommendations for Onion Production, Cultural Practices, Harvesting, and Storage in Honduras. PIP/Honduras/Feb 85/No. 61.
8. Swanson, Marilyn A. Solar Dryer Project: One Year Later. Leyte, Philippines. PIP/Philippines/Oct 84/No. 63.
9. George, Paulette Foss. Recommendations for PITALPRO Library Improvement - Faculty of Science and Food Engineering, Ambato. PIP/Ecuador/Mar 85/No. 65.
10. Kreamer, Ross G. Entrepreneurship and Technical Change: Gari Processing in Ghana. PIP/Ghana/June-Oct 85/No. 71. (Unpublished).
11. Skiles, Robert L. Report of Visit to the Dominican Republic. PIP/Dominican Republic/Sept 85/No. 73.

B. Workshops and Training

1. Robertson, A.F. and D. Creech. A Short Course on Harvest and Storage of Vegetables and Fruits in the Highlands of Guatemala. (A training guide in Spanish). PIP/Guatemala/Mar 85/No. 52.2.
2. Hoyt, Kenneth D. and Marilyn A. Swanson. Burundi Training Program in Food Preservation by Solar Drying with Supplemental Heat. (A course outline and workshop summary). PIP/Burundi/Nov 84/No. 56.
3. Wilson, L.G. and Stanley Agar. Workshop on Postharvest Losses in Perishable Crops. (A workshop in Spanish). PIP/Honduras/Mar 85/No. 64.
4. Williams, Larry G. and Marilyn Swanson. Solar Drying Notes for Solar Drying: Process and Products - A Workshop. (Training guide for a course done at the University of Idaho.)
5. Postharvest Loss Reduction of Perishable Crops. 1984 USDA Five-Week Short Course TC 150-7 at the University of Idaho.

C. General Bibliography

1. George, Paulette Foss. Ethylene Dibromide (EDB) Alternatives for Perishables - A Bibliography. Postharvest Institute for Perishables.

D. Special Bibliographies

Approximately half of the active clients (294 out of 629) received an individualized bibliography during the reporting period. While every major type of crop and every area in which PIP works was undoubtedly represented in the 507 bibliographies generated, there were some areas of particular interest to the clients. Storage accounted for 17% of the bibliographies (with up to half including storage among other topics of interest). Other major areas of interest were food processing (34% of the total when drying of crops is included with other preservation methods), marketing (7%), and postharvest diseases & their control (6%). Interest by crops was as diverse as the Institute's coverage and very uniform:

- 9.9% major root crops
- 9.3% major tropical fruits
- 8.9% major temperate vegetables

The remaining 72% covered a wide range of minor tropical or temperate fruits, nuts, oilseeds or spices.

The PIPIC database was adequate for 82% of the searches, but commercial databases were used for approximately 20% of the requests. As requests become increasingly more specific and the long-term users become more familiar with PIP services, more supplementary sources are being used to obtain information. The recent commercial availability of the entire backfiles of the Food and Agriculture Organization (FAO) AGRIS database is a great boon since there is no longer a need to hand search the printed versions to create bibliographies on the tropical crops so well covered by AGRIS.

E. Research Reports

1. Hasibuan, Nasrun. Postharvest Losses Associated with Exports of Vegetables from Indonesia to Singapore. PIP/Indonesia/June 85/No. 1R. (For Master of Science degree in Agricultural Economics at the University of Idaho - Indonesian graduate student.)

2. Perwaiz, Shahid. Winter Season Demand for Fresh Vegetables: A Case Study of Cucumbers, Peppers and Tomatoes in the United States. PIP/Pakistan/June 85/No. 2R. (For Master of Science degree in Agricultural Economics at the University of Idaho - Pakistani graduate student.)

IX. Miscellaneous Activities

A. NSF Evaluation

In 1984, as PIP was approaching the end of the five-year cooperative agreement, USAID contracted the National Science Foundation to assemble a team of professionals to evaluate PIP's accomplishments to date. A team of four people that had been contracted by NSF, plus two observers from USAID (including the Project Officer), spent the week of December 3, 1984 in the PIP offices and in other official visits at the University of Idaho.

The team studied in depth the various accomplishments, strengths and weaknesses of PIP and concluded that "the PIP concept is laudable and should be continued and promoted by USAID, the University and the PIP staff." The team also made some recommendations for consideration by PIP and USAID for the future operation of PIP and the furtherance of the goals and objectives of the PIP concept.

B. New Cooperative Agreement

Work was initiated in PIP in August and September of 1985 toward the establishment of a new Cooperative Agreement for another five years between USAID and the University of Idaho. The agreement covered by the report, AID/DSAN-CA-0265, expired on September 30, 1985 and steady progress was made toward renewing it or developing a new agreement on that date.

C. PIP Management Information System

Several problems were encountered by PIP in relying solely on the University of Idaho accounting system. PIP was unable to classify expenses by project and the expense classifications used did not provide enough detail for cost monitoring. The UI expense categories did not coincide with the USAID expense categories, which PIP was required to use when making reports to AID. Posting time in the UI Controller's Office for expenditures was often 4-6 weeks, hence PIP could not accurately estimate current available funds for project development and monitoring.

Working with the Fiscal Officer in the College of Agriculture, a computerized database accounting/reporting program was designed. This new system has been "on-line" since January 1985.

The benefits to PIP have been that the system eliminates manual posting which was slow and inaccurate; provides PIP with current working balances at both the Institute and project level; and provides the ability to monitor project costs more effectively, forecast budget requirements and design new projects.

D. The PIP Roster of Consultants

In an ongoing effort to make the PIP computerized roster of postharvest specialists more suited to the requests that PIP normally receives, initial steps are being taken to revise the code list of postharvest categories. The revised code list will be tested on a small group of selected consultants to determine its appropriateness.