PN-AAP-060/62
ISN - 33017
9311323

Postharvest Institute for Perishables

WORKSHOP ON COMMERCIAL POSTHARVEST PRACTICES OF FRUITS AND VEGETABLES

Presented by

The Thailand Institute Of Scientific and Technological Research

with technical collaboration from
The Postharvest Institute for Perishables
and
The Tropical Development and Research Institute

by

Dr. Peggy Pletcher

for the

Postharvest Institute for Perishables

GTS Report No.
PIP/Thailand/August 83/No. 8A

University of Idaho

in cooperation with
United States Agency for
International Development
Project Title: Storage and Processing of Fruits and Vegetables
Project No. AID/DSAN-CA-0265
Washington, D.C., U.S.A. 20523

Workshop on Commercial Postharvest Practices of Fruits and Vegetables

Report to

The Thailand Institute Of Scientific and Technological Research

and

U.S. Agency for International Development
Bangkok

by
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November, 1983

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I. Executive Summary

The Thailand Institute of Scientific and Technological Research (TISTR) requested assistance from the Postharvest Institute for Perishables (PIP) in the presentation of a workshop on "Commercial Postharvest Practices of Fruits and Vegetables." The workshop was presented from August 3 to 9, 1983.

PIP sponsored the participation of Dr. Peggy Pletcher, District Director and Head of Agricultural Communications Center, College of Agriculture, University of Idaho. She presented workshop sessions on "Extension Needs in Low-Cost Technology" and "Implementation of Fruit and Vegetable Loss Reduction Programs." In addition, while in Thailand, Dr. Pletcher visited and consulted with various people in the Department of Agricultural Education and presented a slide-illustrated talk on Agricultural Extension Organization to the participants in the workshop.

Dr. Pletcher collaborated with personnel from TISTR in presenting the workshop to 44 participants from several governmental and private sector interests in Thailand. In this report she presents the workshop topics that she addressed, and discusses her observations of the strengths and needs of the existing extension system.

II. EXTENSION NEEDS IN LOW-COST TECHNOLOGY CONSIDERATIONS IN DETERMINING COSTS

All processes must be evaluated from the point of view of human value. There are two important principles that must be considered in promotion of any change--namely, THE PRINCIPLE OF BEST ALTERNATIVE and THE PRINCIPLE OF NET GOODNESS.

The principle of best alternative suggests that Extension must recommend the adoption of that which encourages change for better in many and change for worse in few or none. The principle of net goodness suggests that Extension must recommend the adoption of that which promotes general welfare of all people--individuals, families, communities, and nations.

All of us in this workshop are involved in promoting change through the transfer of technology. . . . . .

from	INNOVATION AND ADAPTATION	(RESEARCH)
through	COMMUNICATION	(EXTENSION)
to	ADOPTION	(PRODUCERS, PROCESSORS, CONSUMERS)

. . . . .and we must be willing to look at the impact of proposed change.

Change can be justified in order to promote efficiency in production, distribution, marketing and utilization. Efficiency is defined as the relationship between the quantity and costs of inputs utilized and the quantity and quality of outputs generated. It is important to assess the costs of adopting new postharvest handling technology and determine the relative efficiency by measuring the quantity and costs of needed inputs along with the quantity and quality of outputs to be gained.

But Extension must accept the responsibility for considering the impact of any new technology on the people and the places that will be affected. Social as well as economic impact must be considered. There now exist and there will be discovered through research many alternative solutions to the produce-handling problems facing the farmers, middlemen, vendors and consumers involved in the domestic market as well as the producers, processors, exporters, distributors, retailers and consumers involved in the foreign market. Extension must choose the best alternative and thus promote net goodness.

In choosing the best alternative, Extension must assess its own resources and measure the time and effort required to introduce a proposed practice. The agricultural industry will bear the major cost of most postharvest handling innovations, but unless concurrent or resulting reductions occur in the overall product price, such costs will ultimately be borne by the consumer.

AWARENESS --- What will be EXTENSION'S investment in making the industry aware of new materials and techniques?

1. Personnel costs
2. Communications costs
3. Cost of demonstration materials
4. Transportation costs
5. Opportunity costs (Time away from other activities)

ACCEPTANCE --- What will be INDUSTRY'S investment in acceptance of the new materials and techniques?

1. Cost of retraining workers
2. Cost of discarding present handling system
3. Cost of installing and maintaining new equipment
4. Cost of obtaining and storing materials required
5. Cost of fuel, safety measures, and product distribution

UTILIZATION --- What will be the CONSUMER'S investment in utilization of products handled with new materials and techniques?

1. Cost of obtaining, storing, and preparing products
2. Ratio of cost to appearance, nutritive value and palatability of products

QUESTIONS TO BE ANSWERED

ECONOMIC IMPACT

* Will recommended practices be readily adopted?
* Are practices easily learned?
* Does an increase in quantity or quality of product result?
* Will costs increase for fuel, repairs, or marketing?
* Are materials and maintenance services readily available?

SOCIAL IMPACT

* Is the resulting product acceptable and easy to use?
* Will displaced workers find other work?
* Is the social order of the community disrupted?

In summary, new technology should result in higher quality and a greater quantity of products marketed to the consumer. The consumer should find the products acceptable in price, appearance, taste, nutrition and convenience of use. The producer, along with each segment of the produce industry--processor, wholesaler, retailer--should be able to make a profit. The community should remain stable in its economic and social structure. In selecting those practices to introduce and promote, Extension should determine the cost/benefit ratio of each proposed practice. Ultimate costs of new technology are measured as a relationship of input costs to output gains.

COMMUNICATION STRATEGIES: A Guide for Agricultural Change Agents.

Lionberger, H. F., and Gwin, P. H. Assessing Change Variables in Local Communities. Interstate Printers and Publishers, Inc. Danville, Illinois. 1982.

INCREASING UNDERSTANDING OF PUBLIC PROBLEMS AND POLICIES: Proceedings of the 30th National Public Policy Education Conference. Productivity. Farm Foundation. Oak Brook, Illinois. 1980.

III. IMPLEMENTATION OF FRUIT AND VEGETABLE LOSS REDUCTION PROGRAMS

A program is a planned series of actions leading from a recognized need to a desired result. Succesful implementation of any program requires careful attention to each program component

* recognized need
* planned series of actions
* desired result

and also requires that the people expected to benefit from the program be involved in determining the need, preparing the plan, participating in the action, and measuring the results.

Whether the proposed program is intended for an individual to attain weight control, for a family to learn financial management, for an agricultural producer to adopt new plant varieties, or for an industry to improve the postharvest handling of produce, success will depend upon how well the Extension educator and the program participants answer a few basic questions:

What do we have?	SITUATION
What do we want?	GOAL
How do we get there?	ACTION STEPS
How did we do?	EVALUATION

Extension educators may be eager to begin the activities before being able to describe the components of the proposed program. The temptation can be strong to consider only "What do we know?" and "Where can we tell it?" but the time and effort spent in program development and planning will be repaid with results.

A MODEL FOR PROGRAM DEVELOPMENT

INVOLVEMENT

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                                        !----------   GOAL
                              !----------! ACTION 3
                    !----------! ACTION 2
SITUATION ---------! ACTION 1
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EVALUATION

A model for program development can be illustrated by placing the action steps in ascending order, leading from a careful study of the situation and leading toward goal attainment. A line above, stretching from situation to goal, indicates involvement of program participants in each component of the program; and a line below, also stretching from situation to goal, indicates evaluation of program components as well as measurement of progress and results.

How shall we, as Extension educators, answer our first question, "What do we know?" Clearly, we must spend time studying the people, the place, the processes, and the problems we expect to impact with our proposed program. We must ANALYZE the situation. We must live and work among the people we wish to help. We need to know how they live, how they work, what they believe, what they enjoy, and how they learn. We need to know where the people usually get new ideas--from a teacher, from a priest, from a neighbor, from a local official, from a merchant, or from a family member. We need to know whether the people prefer to participate in educational activities as individuals, in small groups, or in large groups and whether in their own homes, in classrooms, or at the workplace. We need to know whether they learn best by reading, by observing, or by doing. Experts from other agencies, other educational institutions, from business and industry, and from religious and charitable organizations can often provide information to assist us in understanding the situation and identifying real needs.

Once we understand the social and economic forces that shape the lives of the people, we should select a few representative individuals who can recognize problems and opportunities, can accept change and can influence others to adopt new ideas and methods. Such representatives can help us learn which problems are the most visible and the most important to the people. And such problems are the first that must be solved.

Next, we need answers to our second question "What do we want?" With the selected representatives, we can describe the objectives and clearly define the goal. We need to know what we hope to achieve, how much, and how long it will take. Together, we can DESIGN the action steps to solve the problems. It is our responsibility as Extension educators to obtain research data and locate information about the latest technology. The representatives can assist us to select appropriate educational methods and instructional aids.

The third question for our consideration is, "How do we get there?" To IMPLEMENT the program, it is important that we speak the language of the people we teach, interpreting the scientific writings of researchers into words the people use and understand. We should select a variety of teaching approaches and learning activities--mass media presentations, method or how-to demonstrations of recommended techniques and products, printed and illustrated guides and fact sheets, classes, and workshops. If possible, we should set up a result demonstration or a pilot program that illustrates what can happen when the recommended techniques or products are used. A result demonstration can be very effective when it is established at a site which many people can visit. Such pilot programs can be most influential when conducted with families, farmers, or processors who are respected and successful.

We can extend our own efforts by encouraging individuals or groups who have tried the demonstrated techniques or products, and found them useful, to teach their new skills and knowledge to others. Those who have learned can often strongly influence their own family members, neighbors and friends, and we can go forward introducing additional action steps. Reports of teaching and learning activities and reports of progress toward achievement of the goal must be provided frequently, to everyone involved in development of the program and to the mass media.

The last question to be answered is "How did we do?" The last component of program development to be described is EVALUATION. But, we should never wait until completion of a program to measure progress. Evaluation is part of every other program component. We should ask the following questions during and after each phase:

"Is and was the ANALYSIS sufficient to understand the situation and both identify and quantify the problems and opportunities?"

"Is and was the DESIGN extensive enough to describe the desired results and define appropriate action steps to reach the goal?"

"Are and were the IMPLEMENTATION conducted with the right educational methods, at the right time, in the right place, with and through the right people to encourage adoption of recommended changes?"

"Is and was data gathered from the people often enough to measure progress throughout the program, determine the result and impact, and provide for final EVALUATION of the program?"

There are barriers to overcome when we try to introduce new technology and to promote change. Some people resist new ideas and prefer to maintain old customs and traditions. Some people have invested much time and money establishing their present methods and think they cannot afford trying alternative methods. But Extension educators can overcome such barriers, if we work with others--individuals, groups and agencies--to insure that we have identified the conditions which need to change; that the proposed changes will improve conditions; and that people have many opportunities to observe and practice the recommended techniques with recommended products.

We can expect successful programs when we involve in the following program development actions:	PEOPLE
*Study the overall situation *Identify specific problems *Quantify opportunities	ANALYZE
*Define clear objectives *Obtain research data *Organize educational activities	DESIGN
*Deliver information *Provide technical assistance *Encourage adoption of new technology	IMPLEMENT
*Observe change *Measure progress *Determine results	EVALUATE

COMMUNICATIONS STRATEGIES: A Guide for Agricultural Change Agents.
Lionberger, H. F. and Gwin, P. H. Interstate Printers and Publishers, Inc. Danville, Illinois. 1982.

PROGRAM DEVELOPMENT PROCESS

analyze	design	implement		evaluate
SITUATIONS AND OPPORTUNITIES	GOALS AND RECOMMENDATIONS	SOLUTIONS AND PROGRAM ACTION	ACTION ASSIGNMENTS (WHO-WHEN-WHERE)	RESULTS AND PROGRESS INDICATORS
Study Identify Quantify	Define Obtain Organize	Deliver Provide Encourage		Observe Measure Determine
INVOLVE	INVOLVE	INVOLVE		INVOLVE
WHAT DO WE HAVE?	WHAT DO WE WANT?	HOW DO WE GET THERE?		HOW DID WE DO?

PROGRAM DEVELOPMENT PROCESS

analyze	**design**	**implement**		**evaluate**
SITUATIONS AND OPPORTUNITIES	GOALS AND RECOMMENDATIONS	SOLUTIONS AND PROGRAM ACTION	ACTION ASSIGNMENTS (WHO-WHEN-WHERE)	RESULTS AND PROGRESS INDICATORS

IV. Observations and Recommendations

The administrative personnel in both TISTR and the Department of Agricultural Extension are technically competent and well educated. Each of the DAE departmental officers and each of the TISTR research directors have obtained a master's degree at one of the land grant institutions in the United States. The Department of Agriculture staff is proud of its role in assisting to enhance Thailand's ability to supply more and better produce to domestic and foreign markets. The workshops that were visited were well planned and well attended. Participants were eager to learn and attentive to each presentation. The workshop sessions provided a good mix of technical training in produce handling and education in the art of promoting change.

During Dr. Pletcher's visits to the Department of Agricultural Extension, she was welcomed as an honored guest as well as a valuable source of program evaluation. The DAE departmental officers and their assistants provided a slide illustrated overview of each function related to the transfer of postharvest technology in rural settings. The slides were of excellent quality and had been prepared by the Extension Information Center. Each Departmental officer is proud of the accomplishments of the operation, but is interested in suggestions for improvement. Some good Extension work is underway in all the areas evaluated--crop promotion, crop protection, agricultural economics, and home economics/youth development.

Specialists in each operation are equipped with subject matter capability, but are limited in methodology for adult education. In the Agriculture program, the subject matter specialists provide training to the agricultural agents headquartered in the provincial extension offices. Fortnightly sessions update the agents in the current problems facing farmers and fortify the agents' knowledge and skill in handling the problems. The Thai Extension education system in agriculture is called T and V, Training and Visitation. After each training session, the agricultural agents are expected to visit specific locations and transfer their newfound information to key farmers. Such farmers, called contact farmers, are, in turn, expected to transfer the information to 10 other neighboring farmers. At each level of training, however, the lecture or classroom method of instruction is used. The agricultural agents have had two years general agriculture preparation at vocatonal-technical training institutions. The agents learn fairly well

through the fortnightly classroom sessions. But at each succeeding level of training--the contact farmers, then other farmers-- the lectures are increasingly ineffective as teaching methods. The need for effective Extension education for the farmer is apparent.

The farmers need to improve their fertilization and pest control methods. Several crops can be produced in one year on the same land, but farmers must establish the appropriate crop rotation systems and learn to use chemicals wisely. Farmers also need to plant varieties of fruits and vegetables that survive well the rigors of harvest and handling in a tropical climate. Farmers especially need marketing information.

The Home Economics program is directed by a professional home economist who is presently assisted by a Peace Corps volunteer with practical experience from work in other developing countries. The departmental goal is to improve the nutritional status and sanitation in rural Thai homes. Malnutrition is endemic in the rural areas and infant mortality remains high, often due to lack of sufficient calories and protein. Disease resistance is low and growth rates are poor, due to parasitic infestation related to poor sanitation. Home economics specialists in the Bangkok office develop various food preparation and food handling methods to promote better family diets and encourage preparation of surplus food to sell at provincial market.

Home economists with two years university training in general home economics are located in many of the provincial and district Extension offices. The home economists organize women in each village into farmer-housewife groups. The women meet regularly with provincial home economists to learn the basics of sanitation, food handling and storage, food preparation and nutrition; and the women meet with provincial agricultural agents to learn the basics of improving the family's income through use of better plant varieties, cultivation methods, and harvest and postharvest handling techniques. The farmer-housewife is expected to oversee the harvest on the family farm, keeping enough produce for family consumption and packaging the rest for market.

On family farms and at the larger commercial orchards and farms, women from families without land work for wages daily in the fields, planting, tending, then picking the fruits, vegetables and rice. Women construct the small baskets used in harvesting, as well as the large baskets used to transport produce to market. Currently, the farmer-housewives are encouraged to plant fruit trees around their homes and grow vegetables for family

consumption in their yards, utilizing their fences to support vine-grown vegetables, fruits or berries. Such plantings are expected to provide beautification to the homesites and to supplement the families' diets, now too often limited to rice alone. Additionally, the home gardening can allow the field crops to be marketed, thus adding to the families' cash income.

The women are also encouraged to use smaller baskets to harvest and transport the more fragile produce, and to line the baskets with moist leaves, then pack the produce carefully after washing it in cool water. The women are learning to place the filled baskets in the shade of trees or bushes at the edge of the fields to await the arrival of the middleman to take the produce by truck to the marketplace.

Some rather innovative teaching methods are used with the farmer-housewife groups. The provincial Extension offices sponsor village contests to recognize the homesites where the most improvement has been made in beautification, sanitation, and food supply enhancement. The farmer-housewives also take turns demonstrating new food handling and food preparation techniques to the rest of the group.

The youth development program, Yuwakasetkorn, known as Y-K, is patterned after the 4-H program in the United States. Many of the Y-K projects for individual youth, as well as for groups, provide experiences in food production and handling. Goals of the program include the development of more adequate protein sources for rural families, enhancing family income, and development of rural leadership in youth and adults.

Over 1000 personnel occupy the five-story Bangkok Extension headquarters building. Each operation that was visited is housed on a different floor. The personnel in one operation have little day-to-day contact and, thus, little familiarity with the work of other operations. Not enough regular interaction takes place between the Department of Agriculture functions of research, extension, and teaching. Each function is based in a different building complex, separated by high fences and walls. At the provincial and district levels, there is little interaction among the research centers, the plant protection centers and the extension offices.

RECOMMENDATIONS

1. The Agricultural Information Center is new, well equipped, and staffed with competent personnel. A grant from the World Bank provided both the building and the nucleus of equipment. Center personnel are skilled in silk screening, photography, and printing and can produce excellent illustrated bulletins and color slides. From the information presented during the six workshops on Postharvest Technology, the Center should prepare a slide set and a series of fact sheets to be placed in a ring binder for use by Extension subject matter specialists and Extension agents.

2. TISTR and DAE personnel should form task force teams on Postharvest Technology. The teams should plan, implement and evaluate projects.

3. DAE should direct its educational efforts to other audiences. Middlemen, retailers, and exporters are some of the marketing chain who receive little Extension information. As a result much food loss occurs as it is transported in the middleman's truck, as it sits in the heat of the provincial market, or as it is shipped to Thai cities or foreign markets.

4. DAE should develop informational packages on key problems and utilize such packages with farmer, farmer-housewife, and Y-K audiences. The same concepts should be presented to each of the groups, but with many different educational techniques, such as method and result demonstrations, tours, and village fairs. Extension personnel need additional training in adult education methods.

5. DAE should place an additional subject matter specialist in each provincial office to promote the transfer of existing Postharvest Technology.

V. ITINERARY

Wednesday, August 3, 1983

7:00	Meet with Workshop team
9:00	Meet with Dr. Conje at USAID office
11:00	Tour of TISTR facilities
13:00	Attend Technical Workshop No. 1 at TISTR

Thursday, August 4, 1983

9:00	Call on Director of Department of Agricultural Extension
10:00	Consult with Crop Promotion Officers of DAE
14:00	Present slide illustrated talk on Extension Organization
15:00	Meet with Peace Corps volunteer

Friday, August 5, 1983

8:00	Consult with Agricultural Economics Officers of DAE
10:00	Consult with Home Economics Officers of DAE
13:00	Consult with Youth Development Officers of DAE
14:00	Consult with Plant Protection Officers of DAE

Saturday, August 6, 1983

Rest

Sunday, August 7, 1983

Tour of Bangkok, including the Imperial Palace, Sunday Market, and Central Department Store with Ms. Sing Ching Tongdee and her family

Monday, August 8, 1983

8:00	Depart for Nakhon Pathom Province
9:00	Visit Nakhom Pathom Agricultural Extension Office
10:00	Visit provincial wholesale and retail markets
12:00	Tour fruit production and packaging field activities
14:00	Depart for Ratchaburi Province
14:30	Visit Ratchaburi Agricultural Extension Office
15:30	Visit Ratchaburi Plant Protection Center
16:00	Tour vegetable production and packaging field activities
17:00	Tour provincial wholesale and retail markets
18:00	Return to Bangkok

Tuesday, August 9, 1983

9:00	Present initial report to Dr. Conje at USAID mission
11:00	Lecture in Workshop No. 6
13:00	Lecture in Workshop No. 6
15:00	Visit Information Center of DAE
17:00	Depart for airport