

### PROCEDURES FOLLOWED IN THE PLANNING ASSESSMENT

Specific procedures followed in preparing the planning assessment are listed below. The sequence is chronological.

1. Individuals familiar with the writing of futurists were consulted for references that project what the future may be through the year 2000 and beyond. From the futurists' general views of the future, a preliminary set of socioeconomic factors likely to influence the technologies that might emerge or be needed to fill certain gaps in marketing technology was generated. This basic set of factors was the foundation on which the rest of the planning assessment was built.

2. Studies on present and emerging technologies in food marketing were reviewed. This review gave the status of currently used technologies, those available but in limited use, and those in the development stage.

3. Two letters were sent to selected individuals. One letter covered technologies in processing and packaging; the other, technologies in transportation, wholesaling, and retailing. The first part of each letter included an explanation of the project and general instructions for the respondents. A list of socioeconomic factors considered important in

shaping emerging technologies, along with a list of technologies, was given in the second part. Respondents were asked to select from the technologies on the list, and from those they suggested the five most important emerging technologies and the reasons for their selection.

4. A preliminary paper drew on data obtained in the literature review plus an analysis of information on the returns from the mailing. The socioeconomic factors were expanded by adding details from research reports and other sources. These factors were used to develop two scenarios for the future.

5. A workshop of specialists was given the preliminary paper to study. The working group, convened in a structured setting with the paper as background material, added in-depth discussions on the technologies with special emphasis on the issues they raised, the urgency of these issues, and the need for assessment.

6. The planning assessment report utilized the panel data along with all other information to make a priority listing of technologies for assessment. Issues raised by the priorities were listed and discussed.

### MAIL SURVEY

Steps 1 and 2 for completing this assessment were outlined in the introduction chapter of this report. The third step was to send a letter to specialists in food processing and distribution. The mail survey had two major

objectives: to provide a broad coverage that would identify emerging technologies across the marketing system and provide information on stage of development and expected issues.

A letter covering processing and packaging was sent to 127 individuals and one covering food distribution to 94 (see appendix C). These letters were sent to selected food technologists, economists, extension personnel and others in schools and universities, industry and trade associations, Government representatives, consultants, and writers for trade publications.

The processing and packaging letter contained a list of socioeconomic factors expected to influence the development of processing and packaging technologies, and the distribution letter included those socioeconomic factors expected to influence wholesaling, retailing, and transportation technologies. Each letter also contained a partial list of technologies that were in limited use or in the developmental stage.

Respondents were asked to comment on the relevance of the socioeconomic factors and add to the list any others they considered appropriate. They were to comment on the list of technologies, add to the list, and then based on their evaluation of the socioeconomic factors, to select in priority order the five technologies they expected to raise the most substantive policy issues.

Replies were received from 38 percent of those receiving letters. The percentage of response was higher for those receiving the processing and packaging letter than for those receiving the distribution letter (see table B-1).

**Table B-1.—Number of Responses to Letter by Type of Respondent**

	Processing letter	Distribution letter
Total letters mailed . . . .	121	94
Respondents		
Total responses . . . . .	58	23
University . . . . .	25	7
industry . . . . .	15	9
Government . . . . .	13	3
Consultants, writers	5	4

The mail survey provided information for the workshop sessions. Twenty-six processing and packaging technologies and 16 distribution technologies were identified for consideration in the workshop. A background paper containing the two lists was given to participants prior to their attendance at the workshop.

## WORKSHOP

The purpose of the workshop sessions was to provide information that would help place in priority order those marketing technologies expected to raise policy issues needing congressional attention. Twenty-one specialists in various fields participated in the workshop.

After a general orientation session, participants were divided into two subgroups. One subgroup of 11 concentrated on technologies in processing and packaging, and the other subgroup of 10 discussed distribution technologies. The participants represented industry, labor, research, trade, consumer, and Government organizations. They were assigned to either distribution or processing subgroups, depending on their knowledge or

interest. A list of these participants can be found at the beginning of this report.

The two subgroups followed the same procedures and used the same materials, except that each group had the list of technologies appropriate for its area of work. The workshop consisted of an evening session (Session 1), one full day with Session 2 in the morning and Sessions 3 and 4 in the afternoon, and a concluding session (Session 5) the next morning.

**Session 1: Orientation.** This session covered workshop objectives and procedures.

**Session 2: Priorities based on probability of adoption.** The processing and packaging subgroup and the distribution subgroup met in

separate sessions. The first hour was spent in discussing the technologies and socioeconomic factors and adding technologies working group members felt should be given consideration. The objective for both groups was to place a priority order on the technologies based on the probability of occurrence and adoption by 1985. In this priority ordering the subgroups did not consider impacts. Probability of adoption was estimated for each technology under two scenarios, each with different assumptions about the socioeconomic factors. Scenario 1 basically projected a set of socioeconomic factors that would not deviate from established trends. Scenario 2 indicated that energy would increase relative to most other costs and that the supply and price of other raw materials would be subject to disruption. Supply and demand conditions would cause an increase in domestic food prices. Consumers would turn toward a meal rather than a commodity concept. Worksheet A (appendix C) provided the means for converting the impact of each scenario to the probability of development and adoption of the technologies. Time limited the exercise to estimating the probability of adoption only to 1985.

Session 3: Priorities based on impact. The two subgroups met separately to determine a priority rating for technologies based on expected impacts, entirely separate from probability of adoption. A technology might have a low probability of adoption but could have severe and widespread impacts if adopted. Probability of adoption and impacts are both important criteria to consider in ranking technologies for priority assessment. The objective was to study the impacts and issues for each technology and then score the im-

pacts on Worksheet B (appendix C). These scores were used to rank the technologies based on impacts and issues.

Session 4: Integration of results from Sessions 2 and 3. All members of the workshop met together in this session, before which OTA staff had evaluated Worksheets A and B and selected the technologies with the highest probability of adoption and those with the highest expected impacts for processing and distribution. In Session 4, impacts and issues for the highest priority processing and packaging technologies were discussed in detail. Worksheet C (appendix C) served as a guide for discussing the impacts and issues across the marketing system.

Session 5: Continuation, Discussion was concluded on the processing and packaging technologies. Most of the session was devoted to discussing the impacts and issues for the distribution technologies with a high probability of adoption and those expected to have widespread impacts. Both Sessions 4 and 5 were designed to maximize the synergism of the specialists as they interacted.

Some workshop members voiced concern over trying to determine a priority ordering of technologies with such a small number of workshop participants. However, the fact that they had access to the mail survey results and were selected for their individual knowledge covering most if not all marketing areas should compensate for the small number in the workshop.

The OTA staff utilized all the material from the workshop for a final priority list of technologies for assessment.

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OFFICE OF TECHNOLOGY ASSESSMENT  
WASHINGTON, D.C. 20510

EMILIO Q. DADDARIO  
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DANIEL V. DeSIMONE  
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### PROCESSING LETTER

The Office of Technology Assessment (OTA) is a scientific advisory arm of the Congress. Created by Congress in 1972, OTA is one reflection of this Nation's maturing realization of the need for new institutional approaches to assure that our national public policy is based to the fullest possible extent on a clear understanding of the potential consequences, beneficial or adverse, of the use of technology.

We believe that consumers, industry, and society as a whole will benefit from looking ahead and identifying possible issues associated with emerging technologies before they become crises. Being ahead of the issues should provide the necessary time and understanding between Congress and affected parties for developing sound and equitable solutions.

In the food area, OTA is attempting to identify and analyze emerging technological and policy issues for the Congress. You are one of a select group asked to help in this effort.

As an initial step, we need your help to identify processing and packaging technologies. Your response should include existing, emerging, or needed technologies. Others will be asked to respond to other areas of food marketing, including wholesaling, retailing, and transportation. We are primarily interested in technologies that exist but have not been adopted or those most likely to be developed and adopted under the socioeconomic and institutional conditions expected to exist during the remainder of this century.

To provide a framework for your thinking on emerging technologies, we have identified a number of socioeconomic factors that should influence the development of technologies in food processing and packaging or that would be affected by the adoption of new technologies (see attachment). In

developing this preliminary list of factors, we reviewed a number of publications by futurists speculating on the future by the year 2000 and beyond. We isolated a number of common factors that may shape the kinds of technologies emerging in food processing and packaging. As work progresses, factors may be added to or deleted from this basic list.

These socioeconomic factors should be viewed as important influences in the development of new technologies or adoption of existing technologies.

For example, one study estimates that manufacturing of food and kindred products accounts for about 4 percent of the total U.S. energy consumption. An increase in the cost of energy would probably result in increased money for research and development on technologies to save energy in processing and packaging. Similarly, changes in the other factors would be expected to influence processing and packaging technology.

With this brief explanation of conditions that will probably affect the adoption of technologies up to the year 2000, we are asking your help in the following ways:

1. Look at the socioeconomic factors we have included plus those you may wish to add, and give us your evaluation of the potential for each factor to promote or deter the development of technologies in processing and packaging.
2. A list of technologies is enclosed to stimulate your thinking. In the context of the problems indicated by your evaluation of the socioeconomic factors, criticize our list of technologies and then add to our list technologies that are currently developed but not widely adopted or those which will be needed to fill deficiencies in marketing technology in the years ahead. In the latter case, feel free to contribute technologies which may appear "far out" or "blue sky" but which conceivably could be part of food marketing in the year 2000.
3. From the technologies on our list combined with those you added, select the five technologies you consider should raise the most substantive policy issues for Congress. Briefly give the reasons for your selections.
4. Make any additional comments, suggestions, or explanations you feel are in order. The areas of food production, nutrition, and consumption are being given similar attention by others in OTA'S food program and the studies will be closely coordinated.

At this time we are primarily interested in brief responses to be sure we have explored the major avenues where marketing technologies may emerge and to get an indication of the priority ordering of these technologies. Responses will be analyzed and incorporated in a preliminary paper which will serve as the starting point for further input and analyses by a panel of experts. Your response within 30 days will be most valuable to our analysis. If you have any questions, please call one of us at 202-225-5949.

We thank you for your cooperation.

Sincerely,

Michael J. Phillips  
Marketing Projects Leader  
Food Program

William W. Gallimore  
Staff Economist  
Food Program

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DISTRIBUTION LETTER

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In the food area, OTA is attempting to identify and analyze emerging technological and policy issues for the Congress. You are one of a select group being asked to help in this effort.

As an initial step, we need your help to identify technologies in food distribution, including wholesaling, retailing, and transportation. Your response should include existing, or needed technologies. Others will be asked to respond to other sectors of food marketing, including processing and packaging. We are primarily interested in technologies that exist but have not been adopted or those most likely to be developed and adopted under the socioeconomic and institutional conditions expected to exist during the remainder of this century.

To provide a framework for your thinking on emerging technologies, we have identified a number of socioeconomic factors that should influence the development of technologies in wholesaling, transportation, and retailing or that would be affected by the adoption of new technologies (see attachment).

In developing this preliminary list of factors, we reviewed a number of publications by futurists speculating on the future by the year 2000 and beyond. We isolated a number of common factors that may shape the kinds of technologies emerging in wholesaling, retailing, and transportation. As our work progresses, factors may be added to or deleted from this basic list.

These socioeconomic factors should be viewed as important influences in the development of new technologies or the adoption of existing technologies.

For example, one study estimates that wholesaling, retailing, and transporting of food and kindred products accounts for about 6.6 percent of the total U.S. energy consumption. An increase in the cost of energy would probably result in increased money for research and development on technologies that would save energy in these marketing areas. Similarly, changes in the other factors would be expected to influence wholesaling, retailing, and transportation technology.

With this brief explanation of conditions that will probably affect the adoption of technologies up to the year 2000, we are asking your help in the following ways:

1. Look at the socioeconomic factors we have included plus those you may wish to add, and give us your evaluation of the potential for each factor to promote or deter the development of technologies in retailing, wholesaling, and transportation.
2. A list of technologies is enclosed to stimulate your thinking. In the context of the problems indicated by your evaluation of the socioeconomic factors, criticize our list of technologies and then add to our list technologies that are currently developed but not widely adopted or those which will be needed to fill deficiencies in marketing technology in the years ahead. In the latter case, feel free to contribute technologies which may appear "far out" or "blue sky" but which conceivably could be part of food marketing in the year 2000.
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