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"Food Research Productivity and Utility"

FOOD DISTRIBUTION RESEARCH PRODUCTIVITY --
AN ASSESSMENT OF PUBLIC VS. PRIVATE SECTOR ROLES

by:

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There has been a lot of discussion on different aspects of productivity in the past two days. This morning I would like to focus on the issue of productivity research, and specifically, where and how do we get it accomplished? I will highlight the status of reported research in the food industry, summarize the results of a 1978 assessment that was conducted jointly by USDA and the private sector, briefly examine some research needs, and raise questions about future food distribution research.

While the assessment is two years old and addresses a broader topic than food distribution, it raises some issues that have direct implication for food distribution research and should provide a base for later discussion. It should not be confused with the assessment currently underway by the Congressional Office of Technology Assessment. Their study of U.S. Food and Agricultural Research is tentatively scheduled to be completed with an interim report to the Congress in March 1981, and a final report by June. They are considering all agricultural research with an emphasis on marketing and distribution.

The food distribution system in this country has evolved into a model

that is the envy of many other nations. One does not seek alternatives to a food system that is working well, and as a consequence there had been little serious discussion about possible alternatives to the present system prior to the late 1970's. But many of the forces that led to the development of this system have changed. Food surpluses have diminished and there is a world-wide demand for our farm products. The era of cheap, abundant energy is over. Spiraling energy and labor costs have added to the cost of goods with the result that an adequate diet is reported to be beyond the reach of an increasing number of families. We have developed a system that is energy intensive, highly transportation-dependent and in many instances, commodity or functionally-specialized.

Let's examine the status of research and development. While food costs have continued to rise, government and industry are spending less and less on Post Harvest Technology (PHT) research. The term Post Harvest Technology was coined as a politically palatable alternative to marketing research, which too many people associate with advertising and promotion research or consumer product testing--activities that fall within the purview of individual private sector firms.

The more than \$270 billion food industry spends slightly over \$1 billion on food-related research including research by government and industry. Approximately three-fourths of this effort is in production-related or non-PHT research areas. The little PHT R&D that is performed by industry is primarily in food processing firms, and even here, the food related R&D amounts to only 0.5 percent of sales, which makes the food industry among the lowest of various industries that conduct R&D. Concern over the effects of trace minerals, excess sodium, and fats in food is spurring food companies to direct even these few research dollars into basic research on nutrition and health (1).

An increasing proportion of the private sector R&D in the food industry is aimed at developing or adapting technology to meet regulatory requirements. Although there is some evidence that regulatory activities can stimulate certain categories of technological innovation, the net effect of EPA, FDA, OSHA, toxicity laws, product liability, etc., on the research side of R&D has been, at best, depreciative. Although regulation affects some firms more than others (10-15% of R&D budgets in the chemical industry), the Industrial Research Institute's trends from 1974-1977 indicate average growth rate increases of from 10 percent for product safety to nearly 20 percent for R&D efforts devoted to proposed legislation (2). A 16 percent increase in R&D efforts on OSHA requirements and a 15 percent increase on efforts devoted to environmental considerations adds further insight to where research dollars are going.

The net result is inattention to wasteful practices in distribution, processing and retailing at a time when this country cannot afford waste, particularly in energy. Consumers have to pay the steadily increasing cost of food, not because of the rising cost of the raw product, but rather because the costs between the farm and the consumer have

risen so much. A considerable amount of these costs might be held down or eliminated by research aimed at technology development and application in the food distribution system.

While these trends and developments have become more and more obvious, the Federal government is also under considerable pressure from both consumers and the White House to reduce its size. As a taxpayer, I support this activity, but as one who is familiar with the Federal establishment, I have to question the approaches being used.

At any rate, in July 1977 the Office of Management and Budget (OMB) directed the USDA to evaluate its "marketing research programs to assure that only that research is performed which would not be done by the private sector" (3). This marketing research in USDA was divided up primarily between Agricultural Research (AR) and Cooperative Research (CR) in the Science and Education Administration (SEA). The basic differences between the research of the two agencies centers on the approach and slightly different thrusts. The Agricultural Research effort (formerly ARS) is conducted at 8 research centers and 32 satellite facilities across the country. The Cooperative Research effort is primarily carried out through the State experiment stations, the land grant universities, and 1890 colleges. Both of these agencies conducted separate assessments of their marketing research programs under the term Post Harvest Technology (PHT). But my comments will be only on the Agricultural Research study.

PHT in SEA addresses the biological and physical problems encountered in moving agricultural products from producers to consumers. It focuses on the problems of quality evaluation, physical efficiency, and protection of food, fiber, and other agricultural commodities during handling, storage, processing, wholesaling and retailing, and includes

transportation throughout the marketing system. A major part of this research was focused on developing new uses and processes for agricultural commodities and was conducted at the former utilization laboratories.

The SEA/AR assessment had three principal parts: (1) a descriptive analysis of the food and fiber marketing system that was designed to provide a background for understanding the linkages of PHT research with the marketing system and with other research programs (i.e., production, human nutrition, safety); (2) an internal assessment by the managers and researchers of the appropriateness of a Federal role in the research and of the contribution of the research to National socio-economic goals; and, (3) an external assessment by a private research firm which included interviews with more than 70 major food firms and associations to get their views. Some highlights of the report are as follows:

- The food industry accounts for 20 percent of all U.S. business activity, but when we speak of "The Food Industry" we are really speaking about many industries.
- Farm and food product prices are generated in different markets and individual products vary with the extent of the marketing services performed as indicated by beef and bread margins (farm-retail spreads).
- The food sector is a major contributor to our balance of payments and could do more. (\$40 billion in export sales are reported for FY80.)
- While the agricultural sector consumes 26.5 percent of the Nation's total energy, PHT uses about 3 times as much energy as farm production. PHT includes a good proportion of the final preparation for human consumption.

- Along with declining innovation, the food industries have not kept pace with the non-food industries in improving productivity.

To look more specifically at the OMB charge, we surveyed our PHT researchers and line managers to determine whether they thought the private sector would pick up PHT research if the government did not do it. Ninety-six percent said, "no."

The principal reasons given for that response were:

1. Because it is basic research with inadequate short-run profit potential.
2. It is high risk research in support of National objectives rather than meeting profit goals of individual firms.
3. It supports the needs of small producers and firms lacking the resources needed to support research efforts and remain competitive.
4. It supports the action and regulatory agencies that regulate these industries.

Another component of the assessment was designed to identify important national socio-economic goals, analyze the interrelationships among these goals with respect to PHT research, and evaluate the extent to which AR PHT research projects contribute to each goal. Seven socio-economic goals were identified with the proportion of research effort devoted to each in 1978, in parentheses, as follows:

Reduction of Losses (16.2%): It is estimated that 20 percent of all food produced in the United States is lost or wasted each year. Technology is needed to reduce the loss and deliver nutritious food to a hungry world.

Productivity (19.6%): Declining innovation is a major concern with productivity growth in the food sector among the lowest of any sector of the economy and with food retailing exhibiting some of the greatest productivity decline.

Product Quality (25.6%): Our increasingly complex society has placed new and more stringent research demands on product quality and processing technology to assure the availability of safe and nutritious food for all.

Balance of Payments (7.0%): Our trade deficit is of great concern. Agricultural products make major contributions to reducing this deficit and could do more if we would adopt an attitude of aggressively pursuing a long term export market.

Energy and Renewable Resources (11.6%): The conservation of fossil fuels, development of alternative energy sources and technology for efficient use of renewable resources are high priorities. If the assessment was conducted today, instead of 1978, this goal would probably be at or near the top.

Health and Safety (11.9%): The safety of our food supply and protection of the food and fiber work environment from hazards such as dust, noise, and other health and safety factors requires much effort. This assessment did not include all of the health and safety work in AR.

Environment (8.1%): Techniques are greatly needed for the safe disposal of solid waste and the effluents from processing and manufacturing that contaminate the environment. This goal would probably have been higher on the list if the assessment had been done 8 years ago.

The order of the goals was achieved by means of a cross support matrix. The goals are listed in terms of their perceived relative interrelationships in

the PHT program. Thus, research that is directed to an important goal, the accomplishment which could strongly contribute to other goals might be considered as more important than research directed at a narrow goal with little cross support. For example, successful research on the reduction of losses could contribute to improved product quality, increased productivity, and enhancing the balance of payments.

Recognizing that the assessment conducted by AR was strictly internal in nature and subject to claims of being self-serving, we contracted with a private sector organization, The Industrial Research Institute Research Corporation, to have them assess our program and comment on our assessment. They responded that internal assessments of a program by the people responsible for its performance are dubious, especially when it could be done by an outside source. After saying that, they then essentially endorsed the conclusions of our internal assessment (3, 4).

But of greater importance to us in the assessment of the program that they conducted was that they obtained some external views of issues that were not part of our assessments. The specific charge to them was to determine whether and to what extent industry would conduct the PHT research with their funds if the government did not do it; secondly, to obtain industry's best estimates as to commercial potential if the research were successful; and finally, to obtain industry comments on the general value and importance of each project to the agricultural industry.

Highlights of the results were as follows:

1. Industry would not assume much of the research program because National objectives differ significantly from industrial objectives of specific firms and the possibility of substituting one for the other had little meaning.

2. Industry would not favor reducing or terminating the Federal program nor could they support the concept that program reduction would be supplemented by industrial or privately-funded research.

3. Industry acclaimed the USDA PHT research.

4. They recommended the establishment of a research advisory board to provide technical input to Federal research managers saying that Federal research should provide a bridge between university science and practical consumer need.

5. They recommended enhancement of research devoted to agriculturally-related human nutrition.

6. While industry officials encouraged research with basic long range objectives, they recognized that the SEA/AR program must take into account the more advanced technology needs of small firms.

7. They favored research support for the regulatory agencies to increase the knowledge on which regulatory activities are based.

8. They indicated there was a lack of adequate market and testing data to predict the likelihood of commercial success for most projects.

9. Principal reasons that industry would not initiate research comparable to AR were based on different missions and objectives:

a. Industrial research must be based on the expectation of profit gain for each specific company in its own competitive market and must necessarily be proprietary whereas Federal research must be broad to benefit all including the consuming public.

b. The risks of economic failure are difficult to meet on a one company basis. Many firms lack the resources and capability (capital, people, organization) to do research. The fresh fruit and vegetable distribution industry was specifically cited as lacking the ability to do research.

c. Food and feed are subject to serious deterioration by insects, bacteria molds and other pests. Federal research benefits all, but only rarely would research in these areas provide significant returns for an individual firm.

Finally, they confirmed that the line between privately and publicly supported research is not well understood by either industry or government and that further interaction would be useful in deciding on the use of public funds for this research. There was also no clear definition of what constitutes basic research. What appears to be basic research to one firm may be applied or developmental to another depending on the size and research orientation of the firm.

It is apparent that relatively little basic research is occurring in the food distribution industry. This is not to say that research does not occur, but what there is, is mostly the application of existing technology or improved handling methods to perform specific rather narrowly defined tasks. Only occasionally does one find anything approaching the concepts of experimental design being used.

As a result, when an innovation is implemented, there is shock and surprise at unexpected impacts on operating conditions that, may initially have been believed peripheral, but, were nevertheless changed in the process. In addition, the predicted net savings to the firm may never materialize. For example,

equipment specifications may tend to focus on potential energy savings without always giving adequate recognition to the impacts of instituting an energy saving device or procedure on sales, merchandizing and display costs.

This reflects the fact that much of the research that is done in the food distribution industry is conducted by equipment suppliers. It's a natural development in view of the fact that many of these equipment innovations have become increasingly complex and require a degree of sophistication in both the natural and physical sciences that supermarket firms could not hope to maintain. My concern is that equipment suppliers naturally tend to focus on areas where they can expect a profit by developing expensive complex pieces of equipment, and tend to ignore how that equipment fits into the total operating environment. There is still a need for engineering and economic feasibility evaluations to help the small firms: (1) verify the performance claims of manufacturers; (2) to fully assess the impact of the equipment on other operators; and, (3) to fill in research gaps where improved operating methods may be needed rather than sophisticated equipment.

There are major changes in most areas of the food business.

We need to reduce duplication and the proliferation of many package sizes both for effective use of cube in handling cases in unitized shipments and for maximizing effective use of shelf space in the store. After all, it is the retailer and the wholesaler that exercise considerable power over the success or failure of a product by accepting or rejecting it in their facility.

It is unlikely that we will ever see a food system that is not labor-dependent. The challenge then is to provide labor with work that is both productive in terms of store operations, and also gives the

employee a feeling of accomplishment and importance. While I am an advocate of checkout scanning because of the accuracy and useful management information it provides, I am also concerned about what it does to the people involved.

A recent article in one of the local Maryland papers cited checker dissatisfaction with the scanning system in their stores. Typical complaints included the fact that multiple passes were needed to get the scanner to read the code; the cash drawers were too low requiring stooping to make change; the scales were difficult to reach; and they had sore backs from the bending and twisting required. Have we not devoted enough attention to the human element that is so necessary to achieve the productivity desired by management? There are indications that some stores that have had this equipment for a period of time are not getting the productivity they had when it was new. Does this mean that we automate the checking and bagging operation, use credit cards instead of cash, and have the checker there just to make sure everything works while talking to the customer?

A different challenge that needs considerable attention is the problem of providing for the food needs of urban and rural area consumers. The supermarkets seem to work well for the suburbs but have problems in the other areas.

The National Agricultural Research and Extension Users Advisory Board had identified competition in the food and agricultural system as one of its 10 priorities for research funding for FY81 that it recommended to the President and the Congress (5). Under this heading they address research needs in innercity food retailing, direct marketing, and changing competition and structure in the agribusiness sector. Consumer groups expressed some similar concerns to the Assistant Secretary for consumer affairs at a recent meeting in California. **They**

identified direct marketing, alternative innercity food distribution systems, aid to small farmers, and food assistance programs among their concerns for USDA attention.

There are other challenges and for the past 30 years or so the USDA has served as one of the catalysts for research innovations in the food distribution area, having at one time more than 14 specialists working in wholesaling and retailing alone. Today, we are almost out of this area of work due to budget cuts and the determination by the department that this is work that could and should be borne by the private sector. We do still have a small research capability that focuses primarily on wholesale market facilities, animal product handling, systems, and transportation needs.

This raises several questions for this society and those concerned with moving food from the farm to the consumer. I would like to suggest a few to stimulate discussion later:

1. What type of research does the society see as priority needs? How do we communicate them, and generate support?
 - a. Should research efforts focus primarily on monitoring and measuring structural change, price behavior, and margins in the distribution sector?
 - b. What about research to improve physical efficiency and productivity? What are the priorities?
 - c. Do we need studies to examine the cost benefits of conducting research in food distribution? As a means of getting support? (Similar to work done for production and utilization research?)

2. Given apparent anti-government sentiments, it seems that attempts to enlist research support for a Federal role might not be very productive. What are the alternatives? Does the public sector (Federal, State, Local) still have a role?
3. The food distribution industry is composed of many small firms. From society's viewpoint, is it better to help them survive now, or eventually breakup the resulting monopolies and oligopolies?
4. What can or should we do? As a research society? Individually?

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