

Chapter II

Introduction

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Introduction

The food and agricultural industry in the United States is by far the largest of all U.S. industries. In 1980, the value of farm assets was \$900 billion, and one of every five civilian jobs was in the food and agricultural industry, which includes chemical companies, equipment manufacturers, transportation, etc. Agricultural products make up the largest single category of total U.S. exports. In times of crop failure elsewhere in the world, this ability of American farmers to produce such an abundance of food has meant the difference between survival and starvation for millions of people throughout the world.

Our agricultural success is based largely on adoption of technology developed through research. Indeed, the application of science to agriculture has significantly helped make the United States a giant of industrial enterprise.

Paradoxically, the United States has never had a well-articulated set of agricultural goals

mandated by law. Yet throughout U.S. history, there have always been presumed goals that government has a responsibility for developing an ever-increasing array of new technologies that efficiently provide adequate food supplies. Because of this national philosophy, set in perpetuity, the United States has never been a hungry Nation—nor is it likely to be in the future.

To carry out the tasks of conducting food and agricultural research, the United States relies on Federal agencies, State agricultural experiment stations (SAES), universities, and private industry. Their research and development efforts and the resultant high production of American farms have assured consumers an ample supply of quality food at reasonable cost. The agricultural sector has been able to do this mainly because technological advances have produced the methods and tools to meet rising consumer demands.

EMERGING PROBLEMS

Despite its continued notable achievements, the food and agricultural research establishment is facing new problems that are exerting severe strains on goal fulfillment. Of prime concern among scientists are indications that new technological developments may not be keeping pace with our needs.

Two events in the early 1970's raised doubts as to the ability to feed an ever-expanding world population. First, the Southern corn leaf blight in 1970 reduced corn production in the United States by about 16 percent. Second, the combination of unfavorable weather and purchasing strategies of centrally planned economies (such as Russia) led to an uncomfortably low grain stock and high prices from 1973 through 1975.

This combination of events resulted in several assessments of the world food situation and its ability to feed an ever-expanding population (NAS, 1975 and 1977; USDA, 1974 and 1979; U.N. World Food Conference, 1974). The consensus of these studies was: 1) world supply-demand balance was tighter in the 1970's than in the 1960's, 2) periodic spot shortages of food could be expected in years ahead and the potential for shortages could become increasingly severe, 3) more trade in agricultural products would be required to satisfy increasing demand for food, 4) government policies should be oriented toward obtaining increased production of food, and 5) need exists to give increased attention to the quantity and quality Of resources available for food production, in-

eluding the need for larger public and private expenditures for agricultural research.

There is a problem of an increasingly tight world supply-demand balance. Without major breakthroughs based on either an expanded resource base or technological developments, the world food problem is likely to become increasingly severe. Since development of a substantially expanded agricultural resource base is uncertain, technological change through research bears much of the burden for expanded food production.

Public support for food and agricultural research has been based on the public interest in an adequate and stable supply of food at reasonable prices. The concept embodies the maintenance of a sustainable resource base to assure a continuing supply for future generations. Realization has traditionally existed that farmers, as individuals or groups, have neither sufficient economic incentive nor scale of operation to conduct their own research programs. In addition, it was believed that the existence of a competitive agricultural structure would result in rapid adoption of new technology by farmers.

This justification for public support for agricultural research is still prominently used. While it still has merit, many changes have occurred in the structure of agriculture that can change significantly the distribution of benefits among input suppliers, farmers, marketing firms, retailers, and consumers. Reality suggests that: 1) large farms have more influence than small farms on public research programs, and 2) some food and agricultural research is not neutral with respect to structure—e.g., technology has been adopted more readily by larger and more mechanized farms than by small and less organized farming interests. The magnitude and effects of these changes have not been adequately evaluated.

Realizing this trend toward industrialization of agriculture, some members of the executive branch, including the U.S. Department of Agriculture (USDA) and the Office of Management and Budget (OMB), have in the

past taken the position that it is no longer necessary to increase investment in certain forms of research. The implication is that proprietary firms have sufficient resources to conduct their own research. This argument has been used with respect to post-harvest technology research. In the future, the argument might be used for nearly all technology-related agricultural research.

In addition to food shortages and the continuing process of industrialization, the 1970's brought a host of new issues and concerns that will continue in the 1980's. Demand developed for more generous food programs, organization rights for farm labor, lower food prices, increased food safety, increased environmental protection, sharing water rights, and improved nutrition.

Today, there are pressing issues that should receive increased research attention. The sustainability of our agricultural system is being severely questioned. The United States is running out of water in parts of the West, droughts persist in much of the country, excessive rates of erosion on some of the most productive lands may prohibit maintenance of a sustainable system, increased costs of energy (fuel and fertilizer) threaten to price our products out of reach, and environmental concerns continue.

Concern exists within the food and agricultural research establishment that because there have been no substantial increases in research funding, this new agenda of issues has transferred and is transferring resources from traditional research interests associated with increasing production and efficiency. This is a legitimate concern, considering that Federal funds have remained relatively constant in terms of real dollar expenditures while the research base has broadened. In addition, the costs of conducting research have increased in real terms. Research today requires more sophisticated and expensive equipment and support staff than 10 years ago. Thus, with the expanded research base, accompanied by higher costs and constant funding levels, many research areas are receiving less funding today than earlier.

Historically, USDA and the SAES have had a close working relationship in U.S. agricultural research. USDA as a general rule has been more concerned with problems of national and regional importance, and the SAES with problems of a local and State nature. The land-grant colleges have grown into universities and generally have become large research institutions. Their research activities naturally have grown not only to include State and local problems but also to have significance on both a regional and national basis. Congress has provided SAES funds for regional research. However, as a result of the 1972 reorganization of the Agricultural Research Service in USDA, there is a question of whether USDA has a national research program or merely a series of local and regional activities. Consequently, USDA and the SAES appear to be working on seemingly indistinguishable problems.

This in itself is not necessarily bad if planning and coordination are appropriately used. But many people, including Congress,

have come to believe that little, if any, overall planning and coordination of research exist, especially at top levels of administration, and question whether national issues are receiving adequate attention. There seems to be much duplication and vying for funds.

By 1977, it became apparent to congressional leaders that new steps were needed to upgrade agricultural research and coordination. As a result, the Food and Agriculture Act of 1977 directed the Secretary of Agriculture to establish: a) a committee known as the Joint Council on Food and Agricultural Sciences (JC) and b) a National Agricultural Research and Extension Users Advisory Board (UAB). Primary responsibility of the JC is to foster coordination of agricultural research, extension, and teaching activities of the Federal Government, the States, colleges and universities, and other public and private institutions involved in the food and agricultural sciences. UAB is responsible for preparing independent advisory opinions on the food and agricultural sciences.

NEED FOR AN **ASSESSMENT**

There have been many studies that have dealt with food and agricultural research. They include reports by the President's Science Advisory Committee (1962), the Committee on Research Advisory to the USDA (1972), the Agricultural Production Efficiency Study (1975), the World Food and Nutrition Study (1977), and USDA's Study of Agricultural and Food Research Issues and Priorities (1978). This latter study reviewed 50 reports and studies dealing with priorities for food and agricultural research. Thirty-two of the reports addressed the inadequacy of funding of agricultural research and called for its strengthening. Few of these studies have addressed the structure of the research system. No attempt has been made to define local, regional, and national problems on a scientific basis in order to assign research responsibilities. Nor has there been any attempt to identify roles of those agencies and institu-

tions participating in domestic and international research or to seek solutions to the problems they face. The question still arises as to the adequacy of the funding level for research, the distribution of the benefits of research, and the quality of research. In addition, there is the question as to whether present methods are satisfactory by which expertise and interest of Federal, State, and private organizations are brought to bear on identifying and conducting research.

Hence many, including Congress, have become concerned over the allocation of resources to various domestic and international research activities and the mechanisms used for development of research priorities. Within the U.S. food and agricultural research system, there appears to be a dichotomy of professed procedures for priority setting and actual practices. Need for a sound,

workable process seems apparent in order to maintain continuity in planning and to keep the research system viable. These concerns led directly to a request from Congress for OTA to make an in-depth assessment of the U.S. food and agricultural research system. Congress stressed that the assessment focus on the structure of the system and that it complement previous studies which identified agricultural research priorities.

In conducting this study, OTA recognized certain emerging factors that are markedly affecting the conduct and decisionmaking within research agencies and their funding sources. One of the more important of these factors is the high cost of performing research today—not only from the standpoint of

spiraling costs for personal services but also because of the need for more sophisticated, expensive research equipment. In addition, the research base has broadened to include new issues such as environmental protection, improved nutrition, and social concerns. Restricted budgets and limited personnel ceilings have also left their mark on the planning of research programs,

Specifically, the request for an assessment came from the Senate Committee on Appropriations and the Senate Committee on Agriculture, Nutrition, and Forestry. In addition, the House Agriculture Subcommittee on Department Investigations, Oversight, and Research has endorsed this request.

OBJECTIVES OF THE ASSESSMENT

The objectives of this assessment are to:

- evaluate the funding, benefits, and burdens of food and agricultural research;
- determine the basis, scientific or otherwise, for the classification of research from a management perspective;
- identify the roles of Federal, State, and private institutions in developing technologies for solutions to international, national, regional, and State or local problems;
- examine the management, structure, and policies of USDA in the conduct of food and agricultural research;
- evaluate methods by which the expertise and interests of Federal, State, and private research organizations can be brought to bear cooperatively in identifying priority research areas; and

- provide public policy options for Congress that will maximize our research potential,

The working groups and advisory committee that prepared and reviewed the resource material for this assessment recognized the urgency for resolving the issues that characterize the situation in the agricultural research sector. They were motivated by a deep concern for maintaining a strong and growing food and agricultural industry. It is hoped that the analysis of these issues and public policy options offered herein will provide a good starting point for increased effective use of the Nation's scientific capabilities and other research resources,

CHAPTER II REFERENCES

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