Timetable: The Project will hold a workshop on HACCP benefit/cost methodology in 1997-98. It will continue to develop work in this area as regulations are implemented and hold a retrospective/prospective conference in 2000-2001.

Participants: Connecticut, FDA, Florida, Kansas, Illinois, Massachusetts, Montana, North Carolina, Ohio, Reading-UK, Rhode Island, Research Triangle Institute, USDA/ERS

Procedure 2.C: Incentive-Based Regulation/Information

Key Questions: Are incentive-based regulatory systems more cost effective than command and control approaches that dictate particular practices or product characteristics? In what circumstances can information (e.g., labeling policy) substitute for other regulatory policies?

Food safety and other food quality attributes cannot be easily observed by consumers and markets for food products may fail to provide the appropriate incentives to consumers or producers for these attributes. Work in this area will be led by Jensen (Iowa) and Morales (North Carolina) and will focus on comparative economic analysis by Project members of different incentive systems aimed at improving food quality and safety. A key question to be addressed is whether information disclosure of quality attributes of foods offered for sale is associated with changes in food quality. Caswell (Massachusetts), Lichtenberg (Maryland), and Wessells (Rhode Island) will develop economic models and use case studies to evaluate the impacts of mandatory and voluntary information disclosure of food quality attributes and whether mandatory programs, including government grading programs, substitute or complement private disclosure. Fletcher (Georgia), Hennessy (Washington), and Segerson (Connecticut) will address the problems of quality variability and uncertainty, and information asymmetry on the structure of food processing and identify welfare improving regulatory responses and policies.

Other research will focus on incentive-based regulation and the impacts on processes (technologies) used in the production of foods with improved food attributes, including safety. The results provide both estimates of changes in costs as well as of improvements in food safety (or other attributes). Researchers in USDA/ERS will examine the relative effectiveness of pre-harvest food safety interventions and examine risk reduction control points in the food chain to achieve safer foods. Other studies of changes in technologies and related costs and improved food attributes will be carried out and coordinated by Fletcher, Lichtenberg, Anderson (Rhode Island), Morales, Jensen, and Henson (Reading-UK).

Anticipated Results: The Project will produce research methodologies that provide improved understanding of use of incentive-based versus command and control-based regulatory systems.

Timetable: The Project will target a major conference on the use of incentive-based systems, with a particular focus on the use of information policy, for late in the Project. It will build to the conference with smaller symposia and paper sessions in the early years of the 5-year Project.

Participants: Connecticut, Georgia, Iowa, Maryland, Massachusetts, North Carolina, Reading-UK, Rhode Island, RTI, USDA/ERS, Washington

Procedure 2.D: Operation of International Food Quality Systems

Key Questions: How will recent trade agreements such as the WTO and NAFTA affect food quality and quality regulatory systems in member countries? To what extent will domestic regulation be influenced by concerns about its effect on international trade?

Caswell (Massachusetts), Wessells (Rhode Island), Fletcher (Georgia), Ollinger (USDA/ERS), and colleagues from the University of Reading (UK) will cooperate in developing models and conducting case studies of international food safety and quality systems. Model development will focus on the role of national- or trading-bloc level food safety and quality regulation as a nontariff barrier to international trade. It will also explore what influence trade agreements such as the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA) will have on this type of regulation.

Case studies to be conducted by several Project members on different safety and quality attributes will be coordinated via use of common models and approaches. The case studies will emphasize analysis of the effects of differing international standards on the food safety and quality available to consumers and the competitiveness of industries based in different countries. Wessells will contribute analysis of the impact of WTO and NAFTA on trade in seafood products; Caswell will conduct case studies of the meat and canned foods industries; Fletcher will analyze the effects of sanitary and phytosanitary standards on the peanut trade; and Ollinger will do case studies of the impact of pesticide regulations on trade in food products. Henson, Traill, Swinbank, and Burns (Reading-UK) will contribute expertise on the food safety and quality control system in the European Union. We expect to hold seminars for planning case studies and to compare and contrast the results of these studies.

Anticipated Results: North American and European Project members will cooperate on research on the dynamically changing world market for food products. Project analysis will contribute to development of government positions in trade disputes and to international efforts to cooperate on regulatory policy.

Timetable: Research will be reported at the major conference on international convergence of food marketing systems to be held in 1999. Project members will also contribute

international analyses to the other food safety conferences held during the five years of the Project.

Participants: Georgia, Massachusetts, Reading-UK, Rhode Island, USDA/ERS

EXPECTED OUTCOMES

The expected benefits of the research program to be carried out under the revised NE-165 Project will accrue to consumers, firms, and government through an improved understanding of the operation and performance of domestic and international food systems. Areas of research emphasis are the impacts of changes in strategies, technologies, consumer behavior, and policies on the economic performance of the food system, and economic analysis of private and public strategies that affect improvement in food safety and other quality attributes. The procedures for the revised NE-165 Project emphasize understanding of the operation of the food marketing system, analysis of its performance, and assessment of government policies intended to influence that performance. Analysis of economic performance is the keystone of the revised Project. An important organizing principle and end goal of this work is to provide road maps of policy options and consequences.

In the next five years, NE-165 will sponsor a worldwide web home page, Internet discussion groups, meetings, conferences, books, reports, and invited paper and symposium sessions that support the development of common research approaches, the summation of research results, and their dissemination to business, government, and consumer groups. The collaboration will be organized in order to both facilitate research and its delivery to users of the information. For example, research on market interactions, vertical coordination, and international marketing will be directly useful to businesses considering market strategies, consumer groups analyzing price and quality in food markets, and decision makers shaping government policy. NE-165's work on developing economic analysis of the benefits and costs of alternative private and public food quality control options will also be directly useful to the same parties. For example, benefit/cost analysis of HACCP approaches will inform private and government actions. The expected outcome of this Project is an improved understanding of the operation of the post farm gate food marketing system. The benefits of this improved understanding will principally be felt in improved private and public decision making and improved performance of the system.

ORGANIZATION

The organization established during the last five years of the NE-165 Project will be continued with minor changes under the revised Project. This organization is as follows:

Officers. All voting members of the technical committee are eligible for office, regardless of sponsoring agency affiliation. The **chairperson** is elected by the voting members to a three-year term and may be reelected for additional terms of office. The current chair, Julie Caswell, was elected in November 1992. The chairperson, in consultation with the administrative advisor, notifies the technical committee members of the time and place of meetings, prepares the agenda, and presides at meetings of the technical committee and executive committee. He or she is responsible for preparing the annual report of the regional project.

The **secretary** records the minutes and performs other duties assigned by the technical committee or the administrative advisor. He or she is elected by the voting members to a three-year term and may be reelected for additional terms of office. The secretary will be elected at the first meeting of the new Project in Fall 1996. The Project also has an **executive director**, Ronald Cotterill, who oversees the activities of NE-165's Core Research Group located at the Universities of Connecticut and Massachusetts (see below).

Subcommittees. The Project has an **executive committee** which is designated to conduct the business of the committee between meetings and perform other duties as assigned by the technical committee. It consists of the Project chairperson, executive director, secretary, and six other members of the committee. These six members are elected by the voting members of the technical committee to three year terms and may be reelected for additional terms of office. They serve staggered terms with two members being elected each Fall. Other subcommittees are named by the chairperson as needed for specific assignments such as developing procedures, planning conferences, and preparing publications.

Core Research Group. Since its inception, NE-165 has maintained a Core Research Group located at the Universities of Connecticut and Massachusetts. Initially, in 1987 and 1988, this effort was funded by contributions from six Northeast Experiment Stations and the Agricultural Cooperative Service of USDA. Beginning in 1988, the Core Research Group has received funding from a CSREES Special Grant to the Food Marketing Policy Center at the Universities of Connecticut and Massachusetts. The Food Marketing Policy Center, as the Project's Core Research Group, has an **oversight committee** made up of the executive committee of NE-165, the Project's administrative advisor, and the Associate Director of the Storrs Agricultural Experiment Station. The Center will facilitate the research efforts of NE-165 by supporting a worldwide web home page, Internet discussion groups, and the NE-165 Working Paper Series; organizing research conferences; developing data bases; and supporting interaction between Project members. It will also contribute directly to the research productivity of the Project by publishing original research.

SIGNATURES

Regional Project Title: Private Strategies, Public Policies, and Food System Performance

Daniel Rossi — Administrative Advisor — 7/25/96 Date

Kathryn A. Lee — Chair, Regional Association of Directors — 8-15-96 Date

James R. Allen — Chair, ~~Committee of Nine~~ Regional Research Committee — 8/8/96 Date

George E. Cosby — Administrator, Cooperative State Research, Education, and Extension Service — 10/1/96 Date

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APPENDIX: DISCUSSION OF PREVIOUS WORK

There are several major and continuing areas of development in research on how changes in the food marketing system affect its economic performance. First is the continuation and expansion of theoretical and empirical analysis of horizontal and vertical market power in food manufacturing industries. Continued concentration and consolidation is occurring in major food industries (Connor et al., Marion). The availability of comprehensive, large, new supermarket scanner-based data allow much more detailed analysis of pricing strategies in differentiated food product markets. Recently, Cotterill (Connecticut) demonstrated the use of such differentiated product price models in a large antitrust case (*State of New York v. Philip Morris*). Following recent theoretical analysis by Houseman (MIT), own and cross-product elasticities were developed for individual brands of breakfast cereal for prices, advertising, couponing, and in-store promotions in order to analyze the price impact of a merger in the industry. The interplay between agricultural demand and industrial organization analysis of branded, differentiated product markets is nascent and needs to be advanced.

A second area of change is in vertical pricing relations and coordination in food and agricultural markets. This was amply demonstrated in NE-165's June 1995 conference on *Vertical Coordination in the Food System*. Changing vertical coordination arrangements in such key sectors as hogs, beef, and identity-preserved grains indicate an on-going need for economic research that analyzes the performance impacts of such changes in vertical coordination.

A third area of change is the internationalization of the U.S. food system and the issue of global competitiveness. The international dimension has to be integrated into analysis of private strategies, public policies, and food system performance because of the increasing globalization of these markets. This focus is distinctly different from a specific focus on international trade or export development.

Current research related to the post farm gate marketing issues NE-165 will focus on shows much development but also that new areas are quickly emerging. For example, the development and adoption of new process and management technologies are important strategies in the age of what D'Aveni calls "hypercompetition." Innovations in production processes, quality management, logistics, and control processes can support strategic goals of cost leadership and/or differentiation. These innovations may occur within a given food sector firm, but increasingly, these innovations are inter-firm strategies between upstream and downstream transaction partners. Both intra- and inter-firm technology adoptions alter the strategy space in a given food industry, leading to changes in market share, competitiveness, and other performance measures. A corollary research question considers the extent to which competitive advantage based on technology can be protected from dissipation by rivals by privileged market position, scale, path dependency of process innovation, or other structural and behavioral variables. Recent advances in information technology and its use throughout the business world have been well documented. Numerous instances of technology adoption

have occurred within the food and agribusiness sector, however, the potential far exceeds utilization to date. Although impressive anecdotal evidence is amply available, there is much less known that rigorously defines the effect of these technological advances on system and firm performance.

Research on economic analysis of private and public strategies that affect food safety and other quality attributes has gained a foothold over the last decade. It focuses on risk perception; risk assessment and benefit/cost analysis; the design of incentive-based regulation and information systems; and, increasingly, the operation of international food quality systems. In the area of risk perception and food demand, the major problem to overcome is that different studies have used different methods to measure risk perceptions, thus making comparison across studies extremely difficult. A comparison of studies of consumer perceptions of risks from residues of pesticides and animal drugs in food found large differences depending on how questions were asked (van Ravenswaay 1995b). Few studies have sought directly to assess the impact of foodborne risk information on risk perception (Eom 1994, 1995, Lin), despite the fact that such research is critical to developing reliable models of the effect of risk information on food demand.

Prior work in this area has concentrated on estimating the effects of changing nutritional and food safety information on food demand. The earliest studies sought to examine the effect of food scares on food demand (Foster and Just, Johnson, Smith et al., van Ravenswaay and Hoehn 1991a). One unsettled issue from these studies is how long such scares affect food demand. Another issue is how food scares differ across types of hazards such as pathogens versus pesticides. A variety of studies have attempted to estimate the impact changing nutritional information has had on consumption of eggs, fats and oils, dairy products, and beef (Brown and Schrader, Capps and Schmitz, Chang and Kinnucan, Kim and Chern, Jensen et al., Putler, Putler and Frazao, Wang and Chern, Zarkin and Anderson). Such studies need to continue in order to document industry trends. However, a problem still to be solved is how to best measure information change over time. Several studies sought to forecast the impact of safety concerns about new food production technologies such as BST in dairy (Douthitt, Kaiser et al., Preston et al.) and PST in pork (Florokowski et al., Halbrendt et al. 1989, 1990, 1991). New studies are needed to see how reality measures up to the forecasts, and to improve forecasting methodologies for the future.

Although there is a sizeable literature on the economic value of health risk reductions (Cropper and Freeman, Fisher et al., Viscusi 1993), little of it is directly applicable to the case of food safety. This is so because most studies have concentrated on hazards involving mortality risk reductions (e.g., occupational hazards), while food safety policies deal with hazards involving morbidity and mortality risks. Many studies are needed since there are many different types of risks involving different types of health problems of varying severity, reversibility,

The existing literature tends to be organized around type of foodborne hazard (e.g., by type of pathogen, chemical contaminant, or nutrient), which are sometimes associated with particular types of foods (e.g., seafood or poultry) (CAST). For example, there are studies of the economic value of reducing *E. coli* (Roberts and Marks), *Salmonella* (Roberts 1988, 1989, Fox et al., Hayes et al.), *Listeria* (Roberts and Pinner), *Toxoplasmosis* (Roberts and Frenkel), pesticide residues (Eom 1994, 1995, Buzby et al., Hammitt, van Ravenswaay and Hoehn 1991a, 1991b, van Ravenswaay and Wohl, Weaver et al.) and illness from shellfish products (Lin and Milon 1993, 1995). Most of these studies have involved first time-efforts to adapt methodologies used in valuing the reduction of other sorts of hazards including hedonics, contingent valuation, experimental design, and cost of illness. Refinements are needed in all of these methods since each has strengths and weaknesses. More applications are needed with respect to each type of hazard in order to generate a range of estimates and evaluate their robustness.

Two broad-based problems hinder the provision of food safety in the United States (Buzby et al.). First, the non-market characteristics of food safety create a gap between public and private incentives to collect food safety information, report such data, and provide socially desirable levels of safety (Eom 1995, van Ravenswaay 1995a, Viscusi 1989). The non-market nature of food safety also complicates understanding who is, or should be, responsible for food safety. Second, there is a lack of an integrated approach to food-safety data collection, analysis, and policy (Roberts et al.).

These two problems complicate analysis to determine what mix of private and public strategies to prevent versus treat acute or chronic food safety risks are most cost beneficial. Intervention strategies, furthermore, are possible at multiple points in the food chain and have different profiles for risk reduction, for impacts on product quality, and for private and public costs to implement. Optimal policies may also vary with "who" are the high-risk population groups. Increasing international marketing adds complexity because different scientific risk literatures exist in different languages, pathogens and pests vary geographically, cultural food production/ preparation/consumption practices alter exposure to risks, and ethical norms differ across cultures.

Federal regulations reducing risks attach very different price tags for saving a life (Breyer, Gillette and Hopkins, Tengs). Tolley et al. find "that gross misallocations of the medical dollar exist that could be reduced through systematic use of health values in decision making" (p. 390). Economic valuation methods continue to improve, especially in valuing premature death (Fisher et al., Viscusi 1993), but much needs to be done to standardize their application to evaluate private and public strategies to reduce foodborne disease risk.

Benefit/cost analysis is increasingly used to assess the efficiency and effectiveness of food safety policies. However, monetizing the benefits of food safety policy is extremely controversial, especially since there is no generally accepted theoretical framework for doing so. In 1994 Congress created a USDA Office of Risk Assessment and Cost-Benefit Analysis

(P.L. 103-354) to ensure that major regulations are based on sound scientific and economic analysis and to coordinate risk analysis work across USDA. Both USDA and FDA have proposed Hazard Analysis at Critical Control Points (HACCP) system regulations to reduce exposure to foodborne pathogens and to place industry and regulatory practices on a stronger scientific footing. USDA used the cost of illness method to estimate medical costs and productivity losses totaling $5.6-9.4 billion annually for seven foodborne pathogens (*Federal Register* 2/3/95). FDA's HACCP analysis estimated a wider range of benefits, including the impact of HACCP on the demand for seafood (1994). NE-165 economists have contributed to improving valuation methodology by holding collaborative research conferences and publishing two books (Caswell 1991, 1995).

The other component of benefit/cost analysis is the estimate of intervention costs. Speakers at the NE-165 co-sponsored conference in January 1995, *Tracking Foodborne Pathogens from Farm to Table: Data Needs for Control Options*, and the June 1995 NE-165 conference on *The Economics of Reducing Health Risk from Food*, clearly pointed out the lack of a coordinated data base on the likely pathogen reduction to be achieved with various control options. Two thrusts are needed to improve economic research on control costs: 1) improved data on the extent of foodborne disease and the impact of control options at different locations in the food chain on reducing risks, and 2) estimates of the costs of alternative private and public control options. Similarly, costs for pesticide and other risk reduction programs need to be evaluated relative to their likely public health protection benefits.

Food safety and other food quality attributes cannot be easily observed by consumers. Markets for food products may fail to provide the appropriate incentives to producers for making these attributes easily identifiable to consumers. For example, without easily obtainable assurances that a food meets a known safety level, consumers would be unwilling to pay a price premium for that level of safety over another product which may not have that attribute. The government sometimes may mandate the provision of such assurance information in the marketplace, however, privately provided food safety and food quality information can also enhance the operation of markets. For example, Wessells and Anderson show that under some conditions, consumers have definitive preferences for alternative types of seafood safety assurances, including public and private, and may be willing to pay a premium for seafood with some of these assurances.

Food labeling is an important means of communicating product quality to consumers. As noted by Caswell and Padberg, food labels play an important role in the food marketing system through their impact on product design, advertising, consumer confidence in food quality, and consumer education about diet and health. There are some economic analyses of the impacts and value of such labels primarily focused on health-related issues (Caswell and Padberg, Kramer and Caswell, French and Neighbors, Ippolito and Mathios). However, much work still needs to be done. For example, analysis is needed to determine whether or not information disclosure of quality attributes is actually associated with changes in food quality. Additionally, it is important to understand how mandatory and voluntary programs compare,

in terms of costs, benefits, and effectiveness. The same questions must be addressed for private versus public programs. In yet another aspect of food labeling which has not been analyzed, consumer responsiveness to eco-labeling and the benefits and costs associated with eco-labeling to consumers and producers must be determined.

A growth in concern over food product quality is leading nations to become more active in product standards regulation. Frequently it is the case that different nations develop different safety standards, perhaps due to differing scientific opinions. However, it is also the case that divergent national food safety standards have often resulted in barriers to trade and added costs for producers and consumers due to the uncertainty these differences impose on the market. Runge, Patterson, and Wessells and Wallstrom, among others, have identified national sanitary and phytosanitary regulations as nontariff trade barriers. These nontariff barriers have been increasingly used to block imports. Theoretically, the purpose of these types of regulations is to protect consumers and producers from unsafe or unreliable products whether produced domestically or imported. However, it is not difficult to draft such regulations in ways that not only accomplish the primary purpose, but also effectively protect domestic producers from foreign competition. Trade organizations such as the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA) have explicitly recognized the difficulties caused for international trade by differing domestic food quality and safety regulations. Both attempt to minimize these nontariff trade barriers.

Several studies have identified the food quality and safety regulations which affect international trade in a variety of agricultural commodities. For example, Kotschwar et al. identify laws governing the use of standards as barriers to trade, specifically in the case of livestock products. Kramer discusses the implications of the hormone controversy between the U.S. and European Union (EU) for international food safety standards. Some studies focus on regional trade, for example, Worley et al. and Bagnara et al., who focused on food quality regulations on agricultural trade between North America and Europe. Forsythe and Lynch investigated the effects of NAFTA on U.S. and Mexican sanitary and phytosanitary regulations.

The above mentioned studies highlight that often the nontariff trade barriers that arise due to differing sanitary and phytosanitary regulations are quite case specific. In other words, the extent to which regulations become trade barriers is highly dependent on the individual commodity. Thus, in order to have a sense of the global effects of these trade barriers, and the effects of trade agreements on these trade barriers, analyses of several commodities must be completed. General conclusions may be drawn when researchers are able to evaluate several case studies together.

ATTACHMENTS

Attachment 1: Project Leaders

*Denotes Station Leader.

Station	Scientist	Areas of Specialization
Arkansas	*William Bailey	Consumer Risk Perception, Consumer Demand
California-Berkeley	*Jeffrey Perloff	Industrial Organization
California-Davis	Garth Holloway	Industrial Organization
	Catherine Morrison	Industrial Organization
	Richard Sexton	Industrial Organization, Strategic Decision-Making
Connecticut (Storrs)	*Ronald Cotterill	Industrial Organization, Competition Policies
	Kathleen Segerson	Benefit/Cost Analysis
	Thomas Steahr	Benefit/Cost Analysis
Florida	C.-T. Jordan Lin	Consumer Demand, Consumer Risk Perception, Food Quality Regulation
Georgia	*Stanley Fletcher	Strategic Marketing, Food Quality Regulation
Illinois	Michael Mazzocco	Strategic Decision-Making
	Steven Sonka	Strategic Decision-Making
	Sarahelen Thompson	Strategic Marketing
	*Laurian Unnevehr	Consumer Demand, Benefit/Cost Analysis
	Michael Ward	Industrial Organization
	Randall Westgren	Strategic Decision-Making
Indiana	John Connor	Strategic Decision-Making, Competition Policies
	per HR 10/8/99 John Connor *~~Catherine Durham~~	Industrial Organization
Iowa	Francis Antonovitz	Industrial Organization, Consumer Demand
	David Hennessy	Food Quality and Safety
	*Helen Jensen	Consumer Demand, Risk Assessment
Kansas	*John Fox	Consumer Demand, Risk Assessment
Louisiana	*R. Wesley Harrison	Industrial Organization
Maryland	*Erik Lichtenberg	Food Safety and Quality

Station	Scientist	Areas of Specialization
Massachusetts	*Julie Caswell	Food Quality and Safety, Strategic Decision-Making
	Kellie Raper	Industrial Organization
	Richard Rogers	Industrial Organization, Advertising
Michigan	*Eileen van Ravenswaay	Consumer Risk Perception, Consumer Demand
Minnesota	Terry Roe	Industrial Organization
	*Rodney Smith	Industrial Organization
Montana	*John Antle	Food Quality and Safety, Industrial Organization
Nebraska	*Azzeddine Azzam	Industrial Organization
	Jeffrey Royer	Industrial Organization, Cooperatives
New Hampshire	*Alberto Manalo	*Strategic Decision-Making
New Jersey	*Rodolfo Nayga	Consumer Demand
New York (Cornell)	Ralph Christy / W. H. Lesser	Strategic Marketing
	Edward McLaughlin	Strategic Decision-Making
	*William Tomek	Strategic Decision-Making
North Carolina	Roberta Morales	Food Quality and Safety
Ohio	~~*Wen Chern~~ Ian M. Sheldon	Economics of Information, Consumer Demand
	James MacDonald	Benefit/Cost Analysis, Food Quality and Safety
	Ian Sheldon	Industrial Organization
Oregon	~~Deana Grobe~~	Risk Perception
Rhode Island	James Anderson	Strategic Marketing, Market Development
	John Gates	Strategic Marketing, Market Development
	*Cathy Wessells	Strategic Marketing, Food Safety and Quality, Consumer Demand
Texas	*H. Alan Love	Industrial Organization
Virginia	*Everett Peterson	Strategic Decision-Making
Wisconsin	*Robin Douthitt	Consumer Risk Perception, Consumer Demand
	Brian Gould	Consumer Risk Perception, Consumer Demand
	Lydia Zepeda	Consumer Risk Perception, Consumer Demand

Station	Scientist	Areas of Specialization
USDA, Economic Research Service (ERS)	Phillip Brent	Benefit/Cost Analysis
	Steven Crutchfield	Benefit/Cost Analysis
	George Frisvold	Consumer Risk Perception, Consumer Demand
	Anthony Gallo	Strategic Decision-Making
	Charles Handy	Strategic Decision-Making, Benefit/Cost Analysis
	Phillip Kaufman	Strategic Decision-Making, Food Quality and Safety
	Carol Kramer	Food Quality and Safety
	Fred Kuchler	Benefit/Cost Analysis, Food Quality and Safety
	Michael Ollinger	Benefit/Cost Analysis
	*Tanya Roberts	Benefit/Cost Analysis
	Ann Vandeman	Risk Assessment
	Michael Weiss	Benefit/Cost Analysis
USDA, Rural Business-Cooperatives Service (RBS)	Donald Frederick	Cooperative Strategy
	Thomas Gray	Cooperative Strategy
	Carolyn Betts Liebrand	Cooperative Strategy
	K. Charles Ling	Cooperative Strategy
	Jerry Namken	Cooperative Strategy
	Thomas Stafford	Cooperative Strategy
	*Randall Torgerson	Cooperative Strategy
	James Wadsworth	Cooperative Strategy
	Roger Wissman	Cooperative Strategy

Other Cooperators

USDA, Agricultural Marketing Service	*Kevin Kesecker	Strategic Marketing
	Larry Summers	Strategic Marketing
USDA, Packers and Stockyards Administration	Gerald Grinnell	Industrial Organization
	*Warren Preston	Industrial Organization
U.S. Centers for Disease Control and Prevention	Anne Haddix	Risk Assessment
U.S. Food and Drug Administration	Richard Williams, Jr.	Food Quality and Safety, Benefit/Cost Analysis
U.S. General Accounting Office	Mary Kenney	Food Quality and Safety, Strategic Decision-Making

Station	Scientist	Areas of Specialization
Agriculture Canada	Ken Ash	Strategic Decision-Making
	John Bamford	Strategic Decision-Making
Farm Foundation	Walter Armbruster	Strategic Marketing
Institute Supérieur Agricole de Beauvais, France	Loic Sauvée	Strategic Marketing
New Jersey	Daniel Rossi	Administrative Advisor
Research Triangle Institute	Donald Anderson	Benefit/Cost Analysis
	Shelia Martin	Benefit/Cost Analysis
	Gary Zarkin	Benefit/Cost Analysis
University of London, United Kingdom	Nigel Poole	Industrial Organization
University of Reading, United Kingdom	James Burns	Industrial Organization
	Spencer Henson	Benefit/Cost Analysis, Food Quality and Safety
	Alan Swinbank	Strategic Marketing, Food Quality and Safety
	Bruce Traill	Industrial Organization
University of Saskatchewan, Canada	Gary Storey	Industrial Organization

Attachment 2: Resources

COMMITMENT OF ANNUAL INPUT BY EACH COOPERATING STATE, AGENCY, OR INSTITUTION
(Reported in Full Time Equivalents)

STATE, AGENCY OR INSTITUTION	SCIENTIST YEARS	PROFESSIONAL YEARS	TECHNICAL SUPPORT YEARS	OBJECTIVES TO BE WORKED ON
Arkansas	.20	.30	.00	2
California-Berkeley	.10	.00	.00	1
California-Davis	.50	.50	.00	1
Connecticut (Storrs)	.50	.00	.00	1,2
Florida	1.00	.00	.00	2
Georgia	.50	.75	.00	1,2
Illinois	1.00	2.10	.50	1,2
Indiana	1.20	.00	.00	
Iowa	.45	.50	.00	1,2
Kansas	.20	.00	.00	2
Louisiana	.10	.00	.00	1
Maryland	.10	.30	.00	1,2
Massachusetts	.70	1.50	.15	1,2
Michigan	.20	.50	.00	2
Minnesota	.20	1.00	.10	1
Montana	.10	.10	.00	1,2
Nebraska	1.20	2.25	.20	1
New Hampshire	.40	1.00	.00	1
New Jersey	.15	.50	.00	1
New York (Cornell)	.15	.00	.00	1
North Carolina	.50	.20	.00	2
Ohio	.30	.00	.00	1,2
Rhode Island	.20	1.00	.25	1,2
Texas	.30	.25	.05	1
Virginia	.10	.00	.00	1
Wisconsin	.40	.00	.00	2
USDA, ERS	4.00	.50	.00	1,2
USDA, RBS	1.00	.00	.00	1
TOTALS	15.75	13.25	1.25	