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**Fourth Minnesota Padova Conference on
Food, Agriculture, and the Environment**

Proceedings of a Conference Sponsored by
University of Minnesota
Center for International Food and Agricultural Policy

Universita degli Studi di Padova
Dipartimento Territorio e Sistemi Agro-forestali

Regione Veneto

Ente di Sviluppo Agricolo

**SESSION III: THE FUTURE OF AGRICULTURE IN
THE U.S. AND E.U**

**PAPER 1: THE EVOLUTION OF AN INDUSTRIALIZED,
GLOBALIZED, CONSUMER-DRIVEN FOOD SYSTEM**

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**The Evolution of an Industrialized,
Globalized, Consumer-Driven Food System**

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**Paper Prepared for the Fourth
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THE U.S. FOOD SYSTEM

Agriculture needs to be viewed as a part of the total food system in the United States. The food system produces, moves, stores, and transforms commodities into food products. It starts with the supply of inputs to farmers and ends with the provision of goods and services to consumers in foodstores and foodservice establishments. The entire food system is a huge industry, with an estimated \$820 billion in final sales to consumers in 1993. It accounts for about 15% of the U.S. economy and about one out of every six jobs.

Although obviously a crucial part of the food system, the place of agriculture relative to other sectors of the system has been shrinking. Farming accounted for 13% of the value added by the entire food and fiber system in 1975 and only 8% in 1988. In 1975 farming was responsible for 3.0 million jobs, 15% of the total 20.2 million in the food and fiber system. By 1988 employment in farming had declined to only 1.8 million, 9% of the total. The proportion of consumer food expenditures that go to farmers (the farm value) has continued to decline and now is only 24%. The reason is the increasing amount of value that is added after commodities leave the farm (the marketing bill). The farm value is 30¢ for the average dollar spent for food consumed at home, while it is 16¢ for food consumed away from home.

The entire food system has become increasingly consumer driven. This directly impacts on foodstores, foodservice establishments, and consumer food product companies. The most successful companies are the ones which best meet the wants and needs of consumers. The products that succeed in a very competitive marketplace, with

some 10,000 new food products introduced annually, are the ones which contain the attributes and characteristics desired by consumers. The effects are transmitted throughout the food system, from one level to the next. Farmers are affected even if they do not sell directly to consumers.

CHANGING CONSUMER DEMANDS

Major changes have and are occurring in Americans' food consumption patterns. A few of the more significant changes will be highlighted here, although these are by no means comprehensive.

- i.) Spending for food consumed at home has declined in relation to food consumed away from home. The latter now accounts for about 40¢ of every dollar spent for food and alcohol.
- ii.) Demand is growing rapidly for TOTE (take out to eat) food, which includes such things as pizza delivery, pick-up at a restaurant, the supermarket deli, and the drive-through window at the fast food place.
- iii.) Going back many years, fats and oils consumption has increased, although the source has shifted more from animal to vegetable.
- iv.) Beef consumption peaked in the mid-1970s and has declined since then. Poultry has steadily gone up and now exceeds beef, according to USDA measurements.
- v.) For beverages, coffee and milk have slipped, whereas soft drinks continue to climb.
- vi.) In sweeteners, corn fructose has surpassed sugar from beets and cane.

According to the annual survey of food shoppers taken by the Food Marketing Institute (FMI), Trends: Consumer Attitudes and the Supermarket, 1992, a sizeable number of consumers say they are now eating more fruits and vegetables, poultry and fish, but less red meat, fats and oils, and fewer snack foods.

MAJOR DEMOGRAPHIC CHANGES

Demographic changes have a profound effect on food consumption patterns. The U.S. population is growing, but slowly, shifting ethnically, getting older, and living in households with fewer people. In addition, many more women are in the labor force and incomes are rising slowly, if at all, for most families.

With the population projected to reach 380 million by 2050, aggregate domestic food demand will grow, but more slowly than in the past. The demand for ethnic foods will increase, especially Asian and Hispanic foods, not only because of increased minority populations, but also the wider consumption of a variety of foods by the general population. Baby boomers will start to reach age 65 in 2011 and over 20% of the population will be over 64 by 2030. The elderly need fewer calories and eat less meat and milk. Fifty-seven percent of all households have only one or two persons. They buy food in smaller packages, have more food away from home and buy more take-out-to-eat food.

Fifty-seven percent of women were in the labor force in 1991, up from 27% in 1940, with 76.6% of women 35-44 years old and 81.3% of women with 4 or more years of college working outside the home. Convenience has become very important in food

products. Over 80% of homes have a microwave. When both the husband and wife work neither has the time or energy to do a lot of cooking when they get home from work. With a weak economy many families have become more cost-conscious in their food purchases. The sales of generic and non-major brand-name products are up, for example, in breakfast cereals.

MARKET SEGMENTATION AND LIFESTYLES

The U.S. population is becoming increasingly diverse. The mass consumer market is breaking up along demographic, economic, lifestyle, and regional lines. Food products are increasingly targeted at particular market segments. Many different lifestyle categorization systems have been developed to segment the market.

The Pillsbury Company developed one lifestyle system in 1988 which included five household groupings:

- i.) Chase and Grabbits, 26% of consumers, are young urban singles and married couples who want convenience and try new and different foods.
- ii.) Functional Feeders, 18%, are older, blue-collar workers who want traditional meals in more convenient ways.
- iii.) Down Home Stokers, 21%, have lower incomes and eat traditional regional and ethnic foods.
- iv.) Careful Cooks, 20%, are older and better educated and want a healthy, nutritious diet.
- v.) Happy Cookers, 15%, have one household member who enjoys cooking and buy basic ingredients.

FOOD ATTRIBUTES

Kevin Lancaster developed a model which suggests that consumers buy products for the attributes and characteristics which they contain. Food product companies try to identify the attributes consumers want through market research. Products are developed to contain these characteristics, which are then emphasized in marketing the product.

In FMI's Trends 1992, taste was said to be very important in food selection by 89% of the consumers surveyed, nutrition by 77%, price 75%, product safety 71%, storability 46%, recyclable packaging 45%, preparation time 41%, and ease of preparation 36%. Dornblaser in 1990 suggested a list of "F" worlds to reflect the attributes today's food consumers want. With some relevant additions and deletions, this list might now include favorable, fresh, fit (healthy), finished (convenient), friendly, fat (non), fractional (small serving size), and frugal.

IMPLICATIONS FOR AGRICULTURE

The impact on agricultural producers of the changing food demands include:

- i.) Aggregate domestic food demand will grow, but slowly;
- ii.) Processors increasingly want uniform materials to produce the value-added products with the specific attributes consumers want;
- iii.) There will be more specification buying and production under contract;
- iv.) The importance of marketing, including commodity promotion programs and targeting market segments will increase;
- v.) An increase in product differentiation will occur, even at the farm level, to meet the demands of different market segments.

FOOD AND HEALTH

There is increasing evidence that the three major causes of death in the United States, heart disease, cancer, and stroke, are affected by diet and lifestyle choices. Nutritional concerns have shifted from underconsumption (nutrient deficiencies) to overconsumption of various dietary components by many Americans, in particular calories, fat, cholesterol, and sodium. Many government agencies and health organizations have provided guidance for a healthier diet.

Although there are some differences, the guidelines basically agree that a healthy diet should have:

- i.) less than 30% of total calories from fat,
- ii.) with less than 10% from saturated fat,
- iii.) cholesterol intake of no more than 300 mg. per day,
- iv.) balance exercise and calories to achieve recommended weight,
- v.) increase consumption of complex carbohydrates (e.g., whole grains) and fruits and vegetables.

The message is getting through to consumers. In FMI's Trends 1992, 58% said fat was a serious health hazard, up from 42% in 1985. Ninety-four percent said it was a serious hazard or something of a hazard. Ninety-three percent said cholesterol was a serious hazard or something of a hazard. However, most consumers have found it very difficult to make major changes in their diets. Average fat consumption is still well above the recommendation. This has created a major market for food products with altered attributes for a healthier diet, such as reduced calories and less fat. However,

products will only succeed if they still taste good. McDonald's sales of its McLean hamburger have been disappointing because of its taste. More and more consumers do seem to want leaner meat products with less fat, though. Many consumers have switched to lean or extra lean groundround, for example.

FOOD SAFETY

Food safety has become a major concern for many consumers. Several food safety "scares" which received extensive coverage by the news media had a significant impact. In 1989 the use of alar on apples became a major issue. This was followed by the Chilean grape tampering incident. In early 1993, several people died and many more became seriously ill from Jack-in-the-Box hamburgers contaminated with E. coli bacteria.

The primary food safety concerns of most consumers focus on the use of chemicals in agricultural production and food processing. Seventy-six percent said pesticide and herbicide residues were a serious health hazard in FMI's Trends 1992. Another 19% saw them as something of a hazard. For antibiotics and hormones in poultry and livestock 53% saw a serious hazard and 36% somewhat of a hazard; for irradiated foods, 35% and 28%; nitrates in food, 40% and 38%; additives and preservatives, 26% and 62%; and artificial coloring, 21% and 50%. The fear is that some of the chemicals used may be carcinogenic, which is also the case with irradiation.

Overall consumer confidence in the basic safety of the U.S. food supply remains high, through. Again according to FMI's Trends 1992, 12% were completely confident, 60% mostly confident, with 24% somewhat doubtful and only 3% very doubtful. In addition, except for short-term specific impacts, such as for apple sales following the alar

"scare," most consumers have not changed their food buying behavior in reaction to food safety concerns. Even though the largest concern relates to pesticide residues, many consumers have increased their consumption of fresh fruits and vegetables.

Furthermore, the demand for organic foods remains limited, although the difficulty of finding it and its higher price are probably factors.

The National Academy of Science (NAS) released a report "Pesticides in the Diets of Infants and Children," in June 1993. The central position of the NAS report is that the risk of pesticide residues to young children has been substantially underestimated. The three government agencies involved, the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the Department of Agriculture, indicated they would coordinate their efforts to give more weight to health concerns in decisions about pesticides and to reduce their overall use. The demand for organic products, and those certified to be free of pesticide residues, may increase. However, it is uncertain whether a substantial number of consumers are willing to pay more for organic or certified products and accept a decline in cosmetic appearance that might be a necessary trade-off.

The current regulation of pesticides uses a risk-benefit approach that considers economic impacts. A substantial reform of the regulations governing pesticides has become almost unavoidable given a 1992 court ruling applying the Delaney clause to pesticide residues in processed foods. The Delaney clause relates to food additives and requires zero-tolerance of possible carcinogens. Pesticide regulation is likely to shift towards a health-based approach using a negligible risk standard, probably of one-in-one

million. This means the hazard can not cause more than one additional death for every million people over their lifetimes. However, any reforms require Congressional approval which may be slow in coming.

ENVIRONMENTAL ISSUES

Broad societal concerns about the environment are going to have a growing impact on agricultural production. Support for agriculture will increasingly be linked to the public's perception that farmers are good stewards of the land. Environmental organizations such as the Sierra Club, are actively engaged in trying to influence agricultural policy.

There will be decreasing support for farm programs simply based on our agrarian traditions and farming as a unique way of life. Public sympathy for farmers facing natural adversity, such as last year's excessive rains and flooding, will continue, though. More generally, public support will be conditional on the belief that farmers produce safe, high quality food in a sustainable, environmentally friendly way. Farm program benefits will be increasingly contingent upon using specified production methods. Environmental regulations coming from the EPA will have a growing impact on farm practices.

Food safety concerns and environmental issues overlap and reinforce each other regarding the use of agricultural chemicals. Strong views are held by both consumer and environmental groups. There will be more widespread adoption of integrated pest management (IPM) and low input sustainable agriculture (LISA) techniques. The focus

may shift from increasing yields to decreasing input use and costs and improving environmental protection. There also may be more attention given to the quality of the output rather than so much to the quantity, at least for some commodities. More research might be directed at reducing the need for chemical pesticides and developing safer alternatives. One of the proposed government actions is to undertake a revision of current pesticide regulations to make it easier to approve new, safer pesticides for use and remove older, less safe ones from use. Genetic engineering may help by allowing improved pest resistance to be introduced into the gene structure of important crops.

TECHNOLOGY ISSUES

Widespread consumer resistance is emerging to some of the new technologies, in particular food irradiation and biotechnology. Irradiation has been approved by the FDA for a number of specific uses, including in poultry processing to combat contamination by salmonella and other disease-causing microorganisms. Given consumer reservations about irradiation, however, poultry processors are not likely to use this technology any time soon.

Bovine somatotropin (BST), also called recombinant bovine growth hormone (rBGH), is a genetically-engineered synthetic version of a natural hormone. Tests suggest it can boost cows' milk production by 10 to 25%. A National Dairy Board consumer survey found that 50% were against using rBGH and thought it would make milk unsafe. Given the surplus production of milk and government dairy policies, consumers could see no clear benefits from using rBGH either in terms of increased

production or lower milk prices. The dairy industry itself was ambiguous about rBGH and many dairy farmers opposed its introduction.

The approval of rBGH for general use by the FDA earlier this year has been a "hot" issue for the dairy industry. Some dairy processors and groceries have indicated they will not use milk from cows injected with rBST. The major focus now is on labeling. It appears that milk and other dairy products will be allowed to be labeled as rBGH-free, but no claims of being better or safer can be made. In addition, a certification program is required since there is no test that can distinguish between rBGH and the natural hormone.

Porcine somatotropin (PST) for hogs might be more readily accepted by consumers than BST. Tests have found that when PST is used the pork is leaner. The use of PST has a clear benefit for consumers, whereas BST does not. It is true, however, that leaner pork is already being produced through breeding and changes in production practices. PST is still awaiting approval. However, the FDA did approve the Flavr Savr tomato for sale to consumers. This tomato has been genetically engineered so that it can ripen longer, gaining more flavor and yet not become too mushy for commercial shipping. It has received quite good reviews in taste tests.

There may be a larger conflict between "technology" and "naturalness" underlying these specific examples. Many people want food to be a "natural" product. Food is not just a source of nutrition, but has important social and psychological dimensions. As so much of our lives become dominated by technology, the "naturalness" of food is important.

INDUSTRIALIZATION OF AGRICULTURE

A term that is coming into widespread use in the U.S. is the "industrialization" of agriculture. It refers to the increasing vertical coordination through contracting and integration among the stages in the food system and further consolidation at the farm level. This industrialization is partly a response to the changes in consumer demand, and their implications, outlined earlier. The structure of agricultural production and the markets for agricultural products are being fundamentally altered. Ownership, contracts and specification buying allow processors to maintain the kind of control over product qualities they need for their processing and to fulfill specific consumer quality demands.

Some form of vertical coordination has long been present for many commodities. A good example is broilers. Poultry processors contract for the rearing of their chickens. They supply the producers with the chicks and feed, supervise the rearing, and the farmer receives payment as contractually specified. Contract production has spread to pork and beef, and now accounts for about 15-20% of production.

GLOBALIZATION

"Globalization" is another term that is increasingly used in reference to the food and agricultural system. Many commodity markets, particularly for the major grains, have long been international with a substantial volume of trade. Because of this, wheat farmers in Kansas must compete against those in France, Canada, or Australia to sell on the world market. More commodities are now affected. For example, orange growers in Florida are in competition with those in Brazil in the frozen concentrate market.

The sourcing of many agricultural products has become international. Americans can now eat virtually any fresh fruit or vegetable year-round because of supplies from Latin America and elsewhere. This is a clear response to a consumer preference for fresh produce. The desire for a diverse diet and individual preferences are increasing the trade in many special products such as French wine or Italian prosciutto. Food safety and health regulations have become controversial issues in this trade. The need to protect consumers is legitimate. However, there is concern that these regulations can also be used as trade barriers.

Food markets for many products are now becoming global. Coca Cola is marketed around the world and is perhaps the most recognized brand name worldwide. McDonald's is now expanding outlets more rapidly overseas than in the U.S. General Mills has formed a partnership with Nestle to sell breakfast cereal in Europe. Kellogg's has made and sold cereal there for a long time.

The diets of people around the world are enormously diverse. However, they are moving in the direction of becoming more similar in many cases. A rise in animal protein consumption has occurred in almost every country that has experienced rapid economic development and income growth in the last 50 years. On the other hand, Americans and some Europeans have reached a point where they are eating less beef.

There is now greater diversity in food consumption patterns within a country, such as the U.S., and many individuals are eating more diverse diets themselves. An American family might pickup a Chinese meal one night, cook Mexican food on the next, and barbecue steak on the third. Americans are eating more pasta and rice. Dietary diversity has a high income elasticity even though total food demand does not.