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CHANGING FOOD MARKETS: IMPACT
ON AGRICULTURE

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Changing Food Markets: Impact on Agriculture

For centuries, the primary concern of agriculture has been producing enough--enough food for the population, enough income for producers, and enough exports for international trade. Now, those of us in the food and agriculture industry are concerned with producing too much--too much corn, too much milk, and too much wheat. Per capita consumption of many traditional foods is falling in the western world as is the rate of increase in the population. Consequently, the effective demand for ever more food is slowing down.

Meanwhile, science and technology are making agricultural production and food processing ever more efficient. Some efficiencies are gained at the expense of environmental pollution and food safety. As concerns about the health of the environment and the health of well-fed populations rise on the public agenda, and information about health and diet linkages improves, the benefits of agricultural productivity will be judged by new criteria. The most successful agriculture in the future will be that which preserves the soil and water, that which produces the most desirable mix of food commodities, and that which produces high-quality, nutritious and safe food.

Food consumption patterns are changing in the United States. Since 1960, the per capita consumption of animal fats declined 33 percent, fresh vegetables (mostly potatoes) 25 percent, eggs 22 percent, and all dairy products 20 percent. The largest increases were in frozen and canned vegetables (206 and 94 percent, respectively), and poultry (96 percent)

(see Figure 1). Over that time, red meat consumption increased 10 percent, but beef has fallen 17 percent from its peak in 1976. Refined cane and beet sugars declined 31 percent while corn syrups increased 658 percent. Counteracting a general decline in dairy was a 161 percent increase in the per capita consumption of cheese and a 1,700 percent increase in yogurt. A widespread perception that the consumption of fresh fruits and vegetables has increased is based on a 23 percent increase in fresh fruit and a 66 percent increase in fresh vegetables since 1972 when their per capita consumption was at an all-time low (3).

These changes in the mix of foods being eaten reflect an evolution in the way Americans live, work, and consume food. New information about diet and health, and new products and lifestyles have altered consumers' preferences and food choices. Reinforced by rising incomes and changing relative prices, consumers' preferences now lead them to demand more variety and convenience, fewer calories, less animal and other saturated fats, leaner proteins, and more fruits and vegetables.

In this lecture, I will discuss some of the social and demographic forces that alter food consumption patterns. Then I will explore some of the possible implications for agricultural producers and processors. The role of government policies in this changing agricultural market and the cost of traditional agricultural programs will complete the presentation.

DEMOGRAPHIC FORCES CHANGING THE CONSUMPTION MIX

Demographic trends believed to be important for changing the demand for various types of food include income and population growth, age

structure, household size, mobility, ethnicity, labor force participation, access to information and enhanced health expectations.

Income

A well-known law of food economics says that as households' incomes increase, a smaller and smaller proportion of the increase is spent for food. Furthermore, rising incomes tend to decrease the responsiveness of the quantity demanded to changes in price (1). Middle and upper income people purchase about the same quantity (though not the same quality) of food regardless of small price changes. They also spend a significantly smaller proportion of their incomes for food. For example, upper income households in the United States spend about 11 percent of their incomes on food, while lower income households spend 40 percent or more (2).

In affluent societies, rising incomes do not increase the aggregate quantity of food demanded. The per capita consumption of food changed little since 1960 even though incomes rose. It remained around 1,400 lb. per person per year, which is about 100 lb. per person per year less than in 1940 (2).

Rising incomes do affect the type of food and the form in which food is consumed. As income rises, more services are demanded along with food. This is evidenced by the growing "marketing bill." Now almost 75 cents out of every food dollar goes for value added to the food after it leaves the farm gate, that is, value in the form of processing, packaging, handling and servicing (2).

On an average, as incomes rise 1 percent, expenditures on food increase about 0.32 percent (2). Expenditures on convenience foods tend to increase more than this. In 1985, meat consumption decreased as income

increased for the first time. This indicates that meat consumption is nearing the saturation level in the United States as it is in parts of Europe. Rising incomes generally increase the demand for meat substitutes, cheese, nuts, fresh and frozen fruits and vegetables and juices.

Increasing Population

Increases in the overall demand for food in an affluent country depends largely on increasing the numbers of people. The United States' population growth has averaged about 1.3 percent per year for the last 30 years and is expected to grow at half that rate over the next 30 years (2). Consequently, the rate of growth in domestic demand for food and for feed grains is expected to slow. Since increases in the efficiency with which animals will utilize feed offsets increases in the consumption of animal products, the increased domestic need for feed grains is expected to be about the same as the rate of growth in the population--less than 1 percent per year.

Aging Population

Worldwide the number of people over age 64 is growing 2.4 percent annually which is faster than the overall growth in the global population. In the United States by 2030, over 20 percent of the population is expected to be over age 65 with an increasing number over age 85. The median age was 30.6 years in 1982, an all-time high, and is expected to be 40.8 by 2030. In addition, the elderly segment of the population is increasingly healthy, affluent, and predominantly female (2).

An aging domestic population has several implications for food consumption patterns. Elderly persons typically: (1) have higher relative expenditures for poultry, fruits, vegetables, bakery products, and cereals;

(2) have smaller relative expenditures for milk, soft drinks, and red meat; (3) spend a smaller portion of their food dollars eating out; and (4) spend less per person for food since daily caloric needs decline with age (1). For example, the recommended daily allowance of calories for women drops from 2,100 at age 19 to 1,650 at age 65 (3).

Mobility and Ethnicity

Increased immigration, regional migration, foreign travel, and a growing proportion of nonwhites in the U.S. population increases the variety of foods consumed. The nonwhite population is growing twice as fast as the white population. Nonwhites spend less per person on food in general, but more on pork, fish, eggs and poultry. The continued popularity of Mexican, Oriental, Italian and other ethnic foods reflects an increasing preference for food variety among the general population.

Decreasing Household Size

The average household size has decreased from 3.8 persons in 1940 to 2.7 persons in 1985 and is projected to decline to 2.4 persons by the year 2000. Nearly a quarter of U.S. households have only one member, while 55 percent have two or fewer members (3). Factors influencing this trend are lower birth rates, increased divorce rates, marrying later or not at all, and increased longevity.

Studies show that smaller households: (1) spend 44 percent more per person on food; (2) spend a larger portion of their food budget for convenience including food away from home (singles spend up to 50 percent of their food dollars eating out); (3) consume relatively large quantities of poultry, fruits, and vegetables (except potatoes), cheese, fish, soft drinks, and bakery products (except bread and cereal); and (4) consume

relatively small amounts of fresh dairy products, pork, beef, eggs, sugars, sweets, and processed vegetables (3).

Women in the Labor Force

Almost 70 percent of women age 25-44 are in the labor force and 73 percent of them worked full-time in 1986 compared to 86 percent of working men. The amount of time spent in the labor force is declining for men, but studies show that women still do the majority of housework. Relative to men, women have a decreasing amount of leisure time, that is, time not working in the home or working for a wage. The main impacts of these trends on food consumption patterns result from the increased value of time and higher household incomes (3).

Households with working wives had average median weekly earnings which were 51 percent higher than households where only the husband worked, while in 1984, one-fifth of working wives earned more than their husbands. The increased income and decreased leisure time in dual earner households increases the demand for variety and convenience in foods. As a result, increased demand for relatively inexpensive and fast service restaurants and for carry-out foods has occurred in the food away from home sector. Some studies indicate that men (77 percent by one study) are doing more of the grocery shopping and cooking. These trends have affected food retailing practices, but there is little evidence about how it impacts foods purchased. Single men are known to eat out more and buy more convenience foods and more meat than the average food shopper (3).

Health and Educational Forces

Publicity about scientific research has heightened awareness of the relationship between diet, health, and longevity. Food habits change

slowly, but health related trends are apparent--specifically, a decline in the consumption of fresh whole milk, red meats and eggs following increased information about cholesterol. Increased consumption of cheese and some seafoods defy these health concerns, but the relative increases in poultry, whole grains, fruits and vegetables support them, as does the growing per capita consumption of vegetable oils versus animal fats. These changes in the preferences of American consumers are partly attributable to education. The publication of "Dietary Guidelines for Americans" by the U.S. Department of Agriculture and the U.S. Department of Health and Human Services has been a major force in this educational process. The seven guidelines suggest: (1) eating a variety of foods, (2) maintaining a desirable weight, (3) avoiding too much fat, especially saturated fat and cholesterol, (4) eating foods with adequate starch and fiber, (5) avoiding too much sugar, (6) avoiding too much sodium, and (7) limiting the intake of alcoholic beverages. Some preliminary results of research I am doing shows that the eating patterns of Americans are evolving in the directions suggested by the Dietary Guidelines with a few exceptions. We still need to eat less cheese, less total fat, fewer nuts, and drink fewer sweetened soft drinks to consistently move our eating patterns towards the recommended dietary goals. Studies done by the Food and Drug Administration show significant increases in the number of persons who purchase low-sodium foods. Although alcoholic beverage consumption increased 33 percent since 1964, most of the increase has been in beer which has a considerably lower alcoholic content per volume than wine or distilled spirits. Americans have increased their total per capita intake of fats by 6 percent and sweets by 35 percent, but the composition of the

fats and sweets has changed in the directions suggested by the Dietary Guidelines. Between 1960 and 1984, the proportion of total fat attributable to vegetable fats and oils increased from 58 to 78 percent. The proportion of caloric sweeteners attributable to refined cane or beet sugars dropped from 86 to 46 percent.

The variety of foods eaten is increasing while concern about being overweight has influenced the types and quantities of food eaten. Twenty-eight percent of Americans are said to be overweight. Among adults, 7 percent of men and 16 percent of women report being on a reducing diet at any moment in time. National Food Consumption Surveys show that the per capita daily caloric intake decreased from 2,036 calories in 1965 to 1,826 calories in 1978. Since the pounds of food consumed per capita has increased, intake of higher caloric foods must be in decline (3).

IMPACTS OF CHANGES IN DOMESTIC FOOD DEMAND ON AGRICULTURE^{1/}

Evolving consumer preferences for convenience, variety, fewer calories, less animal fat, lean protein and more fruits and vegetables are changing the mix of foods being purchased in the U.S. food market. Very similar trends are found in much of Europe. Farmers can no longer assume that all food produced is desired by the consuming public or that consumers have the capacity to eat the quantities of food being supplied. These changes will impact farm prices, incomes and structure, especially for those producers who depend heavily on domestic demand or on exports to the affluent western world.

^{1/} The rest of the paper draws heavily from reference 3.

Farm Prices and Income

Farm prices and income from basic agricultural commodities such as grains depend less on trends in domestic food consumption than on national farm policies and macroeconomic conditions, international trade, and world food demand. However, trends in food consumption patterns observed in the United States are also observed in much of the rest of the western world. A change in the mix of the foods demanded around the world will put downward pressure on the prices of traditional foods in excess supply including grains, red meat and dairy products.

Declining consumption of red meats in the form of steaks, chops and roasts suggests a decreasing demand for feed grains. Substituting poultry and hamburger for corn-fed beef tends to push corn prices down and limits relative price increases of fed beef and pork. Continued increases in the consumption of poultry and the use of high fructose corn sweeteners in soft drinks partially offsets falling corn prices by using large quantities of corn.

The increase in aquaculture also promises to increase the demand for some feed grains. The 150 percent increase in fish production over the past five years is in direct response to an increased demand for fish. Even though fish prices rose twice as fast as red meat prices since 1970, annual per capita consumption increased 3.3 pounds in the United States.

U.S. Department of Agriculture (USDA) studies indicate that the domestic demand for feed grains will only grow at about the same rate as the population. Yet, government and farmer-owned reserve stocks of food and feed grains and manufactured dairy products are very substantial and

growing. Farmers specializing in commodities with excess supplies can expect lower income growth than those specializing in foods for which domestic or export demand is growing. Disregarding government income support payments, farmers who specialize in crops such as fruits and vegetables, poultry and fish or those who tailor farm commodities for specialized processing and retail markets are likely to find the best prices and income opportunities.

Structure in Agriculture

The trend towards a bimodal distribution of very large and very small farms will likely continue. A move towards branded fresh foods (fruits, vegetables, meats) will increase contract farming and make it harder to market surplus commodities on the generic commodity markets. Food processors, retailers, fast food chains and the institutional trade are continuing to integrate vertically. These arrangements increase the opportunities for logistical control, risk management and market power.

Farm production for smaller, specialty markets will increase the need for sophisticated farm management and marketing skills. The production of specialty foods, without assured markets, entails considerable price and income risk as well as higher risks from disease and pests. Size economies in production, marketing and coordination of specialty products may induce differential impacts by region and size of operation. Market access could become more problematical for many smaller or autonomous farm operations.

Agribusiness

Agribusiness should continue to profit from market segmentation, product differentiation, and research and development of products, processes, packaging and regional markets. Advances in the technology of

flavors, colors, emulsifiers, food substitutes and additives as well as production processes and packaging will enhance the abilities of agribusiness firms to adjust to consumption trends.

Agribusiness firms and food processors are likely to maintain sizable research budgets to document and/or alter product characteristics and to promote or attack research on health issues such as the cholesterol linkage to heart disease or the benefits of calcium for diminishing the effects of hypertension and osteoporosis.

Nutrition, health, safety and quality concerns will continue to demand that agribusiness firms and food retailers provide information about food product characteristics both in procurement (grades and standards, health and safety inspections) and marketing (nutritional and ingredient labeling and advertising).

POLICY ISSUES AND CHANGING FOOD DEMAND

Health and Safety, Nutrition and Quality

Health and nutrition, food safety and quality, and environmental concerns are expected to continue to have high priority in the public policy arena. Several policy questions arise about how to set policy guidelines for these matters. For example: (1) Industry supported research in these areas has become an essential strategic weapon to defend product characteristics and image. Do these research results need to be verified by independent and neutral scientists? (2) Federal guidelines and recommendations as well as consumer behavior ultimately reflect research findings. How will the process by which health and environmentally related research is funded, evaluated and disseminated impact its usefulness to

consumers and producers? (3) Continual reevaluation of grades and standards, federal/state inspection procedures, and labeling requirements for a wide range of food and related products will continue to be demanded as a public service. How much are we willing to spend for guaranteed safe food? How much are we willing to spend for better information about our food, and what are we entitled to know? (4) Voluntary regulations and standards are being advocated by both government and private firms. Can they be promulgated more quickly than government standards? Will they have credibility? Can they be enforced?

Balancing Supply and Demand: Consumers' Costs and Government Role

An overriding policy issue concerns the role of the government in subsidizing the production of agricultural commodities that are in excess supply and are expected to remain so in the foreseeable future. One might ask why a society encourages and approves agricultural policies that foster long-run excess supplies? For one thing, it is generally believed that agricultural price support policies that encourage abundant production favor consumers by putting downward pressure on food prices. After all, except during the 1940s and again in the 1970s, real food prices fell throughout this century in the United States. The portion of household incomes spent on food has fallen as well.

Some farm programs try to limit the quantity of food that enters the domestic marketplace. These programs include marketing orders, import barriers and export subsidies. These programs raise both the farm price and the retail price. One estimate of the indirect costs of food and agricultural policies to U.S. consumers is about \$7 billion per year. Other estimates show that if the government were to stop all attempts to

keep surplus food off the market, the farm price of commodities would fall 15 to 20 percent over a three to four year period, and the price of food (particularly meat) would also decrease by about 3 percent.

Studies by the Organization for Economic Cooperation and Development (OECD) and the USDA have estimated the extent to which various countries are subsidizing their agricultural producers and food consumers. Using the much touted producer subsidy equivalent (PSE) measure, these subsidies show that about 9 percent of most Australian agricultural producers' receipts come in the form of government payments. This compares to an average of 22 percent in the U.S. and 72 percent in Japan. The consumer subsidy from agricultural programs is negative in most developed countries. This means there is a net flow of dollars from consumers to agricultural producers turning their subsidy into a tax. The consumer tax equivalent in Australia is estimated to be between 10 and 24 percent for wheat, milk and sugar; it is more for rice and less for meats. The consumer tax equivalent in the United States is less than 10 percent on meats, 10 to 24 percent on dairy products and over 50 percent on sugar. This means that about 50 percent of consumers' expenditures for sugar represent a tax that is used to subsidize sugar producers.

Consumers also pay direct taxes to support food and agricultural programs. In the United States, these costs rose dramatically in the early 1980s. Ninety percent of the agricultural program costs went for commodity price supports, averaging about \$18 billion per year. A roughly equal amount was spent on food and nutrition programs, primarily on food stamps. In the early 1980s, these food and agricultural programs cost the average U.S. household between \$350 and \$400 per year in taxes.

A major policy question arises over taxpayers' willingness to pay for price supports on commodities that are in excess supply. If these costs are minor compared to potentially higher food prices and/or alternative public costs of unemployment and retraining, they may be readily justified. There is a strong possibility, however, that such justification will be called for by future taxpayers who are predominantly nonfarm in background and are increasingly removed from their agrarian heritage.

The international trading community is also responding to the world's changing demand for agricultural commodities. Looking at the producer and consumer subsidy estimates around the world, trade negotiators for the United States and Australia are calling for an international agreement to end agricultural subsidies that raise domestic prices about the world price and encourage excess supplies. Clearly, countries with relatively low producer subsidy equivalents have the most to gain from such an agreement. Fewer of their farmers will be forced out of business or into different commodities, and their products will have a better chance of selling on the export market.

No one really expects all westernized countries to stop all of their agricultural subsidies. A compromise position will probably be reached, but the fact that it is on the table for discussion means that government policies and agricultural production may begin to move in the same direction as current and future demand for food.

Many people, including your own Geoff Miller, of the Australian Department of Primary Industry, have written about the worldwide agricultural crisis and the need for policy reforms. There is a tacit recognition that this crisis is linked to a slowed growth in food demand in

the developed world, but few have examined its details and long-run implications. I suggest that it plays a critical role in determining future agricultural markets along with political, financial and macroeconomic forces. Furthermore, it is a relatively well-known and predictable phenomenon. It can be accommodated in the planning for inevitable changes in the agricultural industry if it is well understood.

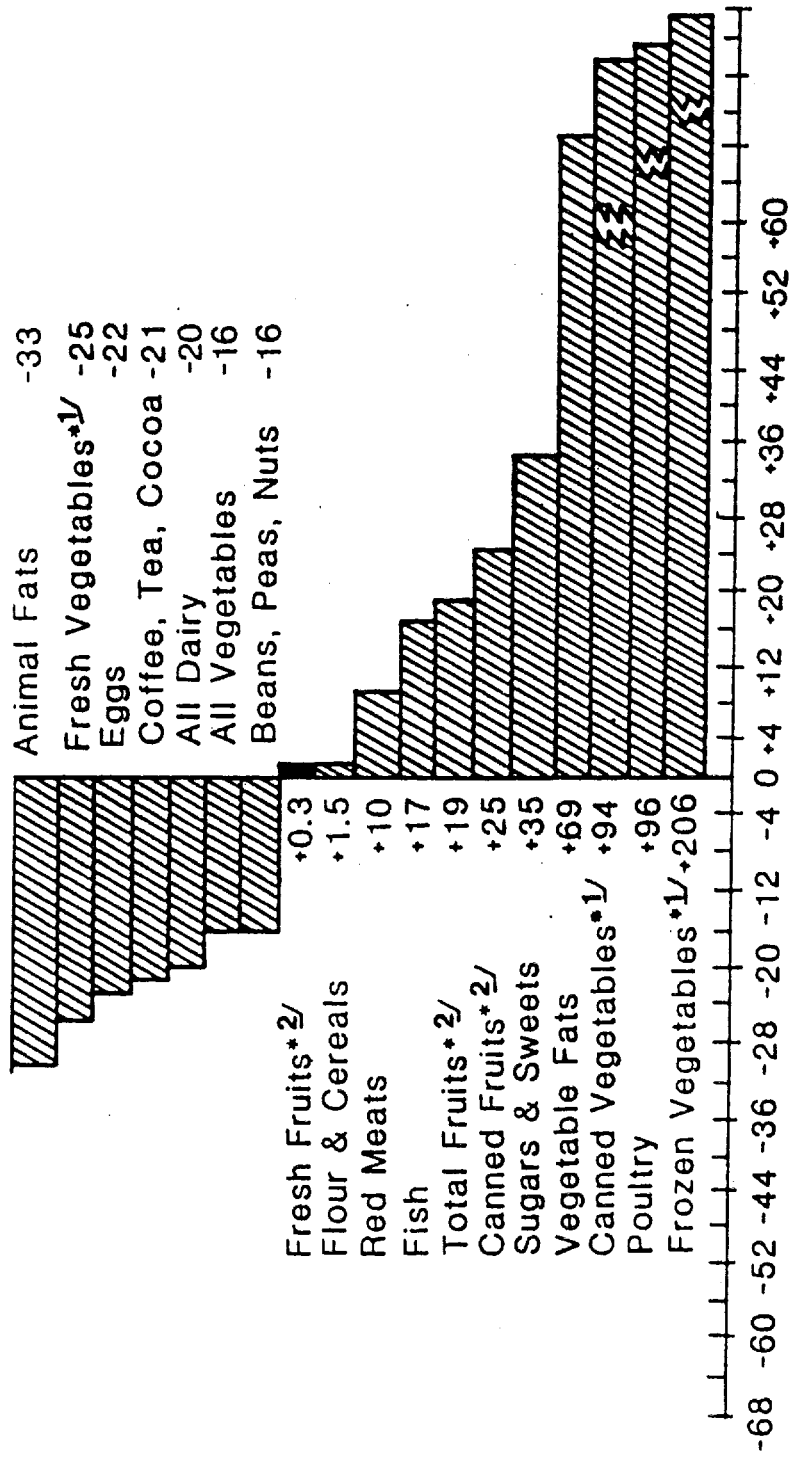
To quote Mr. Miller,

"The time is ripe for rural leaders to join the vanguard of change instead of constituting the ballast that militates against it." (4, p.66)

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Figure 1. Percentage Change in Per Capita Consumption of Major Foods in the United States, 1960-1984.



1/ vegetables include potatoes

2/ fruits include fruit juices

* 1960-81

Source: U. S. Dept. of Agriculture, "Food Consumption and Expenditures", Statistical Bulletins No. 565 & No. 736, and "Background for 1985 Farm Legislation", Bulletins No. 466 & No. 476.